



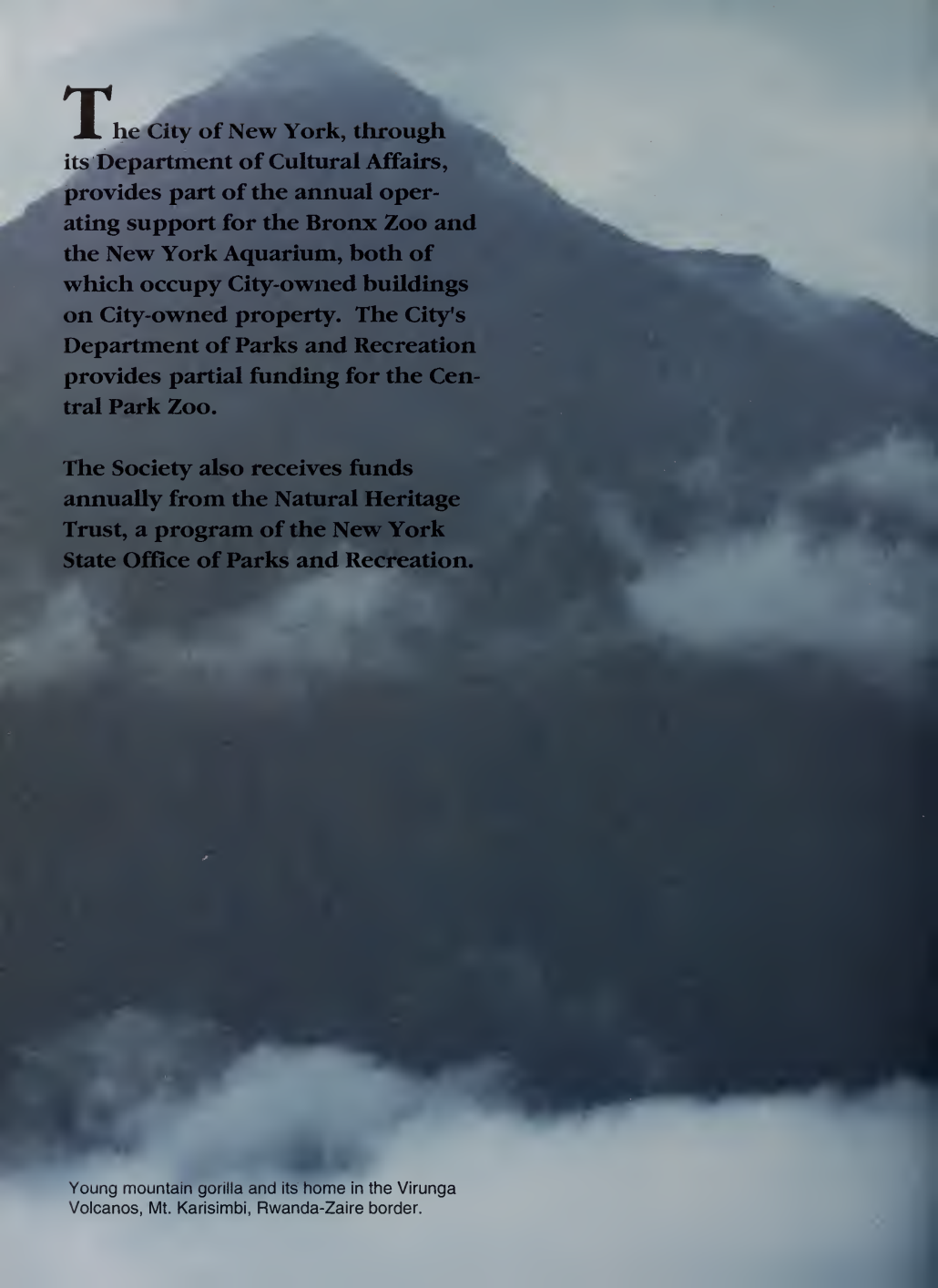
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New York Zoological Society

A close-up, black and white photograph of a gorilla's face. The gorilla has dark, wrinkled skin and deep-set eyes. Its mouth is slightly open, showing its teeth. The texture of its fur is visible. In the bottom left corner, there is a small, bright green leaf.

Annual Report
1990-1991



The City of New York, through its Department of Cultural Affairs, provides part of the annual operating support for the Bronx Zoo and the New York Aquarium, both of which occupy City-owned buildings on City-owned property. The City's Department of Parks and Recreation provides partial funding for the Central Park Zoo.

The Society also receives funds annually from the Natural Heritage Trust, a program of the New York State Office of Parks and Recreation.

Young mountain gorilla and its home in the Virunga Volcanos, Mt. Karisimbi, Rwanda-Zaire border.

To Sustain Biological Diversity

To Teach Ecology

To Inspire Care



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New York Zoological Society
(at June 30, 1991)**

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Report of the President



Trustee participation in Society affairs reached a new level of commitment during the year. The work of the capital campaign's Leadership Committee intensified under Chairman Dailey Pattee as the scope of support grew for projects that will help to define the Society's future. And there were new initiatives, with volunteer committees formed for Education under Anthony D. Marshall, and for Marketing and Communications under John Elliott, Jr. Trustees and staff are working closely on both committees to lend greater support to these pioneering programs.

The need to close ranks has been made all the more compelling by the general financial difficulties of New York City and New York State, both of which provide major support to the Society and other City cultural and scientific institutions. Of course, the ef-

fects of funding cuts on the Society are particularly grievous since its living animal collections must be maintained at all costs.

Last year, City operating support to the Bronx Zoo and New York Aquarium (excluding heat, light, and power) through the Department of Cultural Affairs dropped by five percent to \$7,662,696, and State support through the Natural Heritage Trust by 15 percent to \$1,786,467. City support to the Central Park Zoo through the Department of Parks and Recreation declined seven percent to \$2,507,024. Reductions for the present year promise to be even more drastic, so the need for redirecting some programs and exploiting alternative sources of support, particularly through marketing and promotion, has become imperative.

One bright note was the success of NYZS programs, particularly those of Zoo Education and Wildlife Conservation International, in obtaining Federal funds. A total of \$3,400,000 was granted by the U.S. Agency for International Development, the National Science Foundation, the Institute for Museum Services, and the Department of Education's National Diffusion Network.

Other bright notes involved the support of people, including 3,519,330 visitors to the Bronx Zoo, New York Aquarium, and Central Park Zoo; 37,345 NYZS members (an all-time high); and 56,000 members of Wildlife Conservation International. Fund-raising efforts brought in a total of \$14,948,482 in dues, gifts, pledges, and bequests, and included a number of major individual, foundation, and corporate contributions for capital and operating purposes.

There were some extraordinary gifts to existing programs. The Edward John Noble Foundation continued its support of the Wildlife Survival Center on St. Catherines Island with a gift of \$359,000. The Charles E. Culpeper Foundation gave \$100,000 over two years for the new Genetics Research Program. Under outgoing President Adair Beutel, funds were raised

by the Women's Committee's June event at the Bronx Zoo, "Monkey Business," for the planned Great Gorrilla Conservation Project. The Business Committee's Corporate Benefit at the Central Park Zoo, under co-chairmen Eugene R. McGrath and Robert G. Schwartz, raised more than \$129,000 for education and field conservation programs.

Major gifts to the field programs of Wildlife Conservation International included \$317,000 from the Liz Claiborne and Art Ortenberg Foundation, \$315,000 from the John D. and Catherine T. MacArthur Foundation, \$150,000 from the Kelberg Foundation, and a long-term fellowship pledge from Advisor Sue Erpf Van de Bovenkamp through the Armand Erpf Fund.

The George F. Baker Trust's gift of \$1 million headed the list of gifts to capital projects, many of which were specifically designated. The future Ecology Education Center received \$510,000 from The Bodman Foundation, \$285,000 from the Henry and Lucy Moses Fund, \$250,000 from The Vincent Astor Foundation, and \$135,000 from The Achelis Foundation. Dr. Judith P. Sulzberger gave \$500,000 for Teacher Training and the International Field Veterinary Program. The Robert Wood Johnson Charitable Trust gave \$450,000 to the Crisis Fund for Vanishing Wildlife. And Citibank provided \$100,000 for Minority Education Scholarships. More than \$18 million has now been raised for the current capital campaign.

The Society lost one of its oldest friends and supporters with the death of Otto Marx, Jr., who had served as a trustee and an advisor for 33 years. He was particularly effective as a member of the Business Committee, to which he contributed his time and expertise in behalf of conservation and education.

The death of Mr. Marx and the departure of Mrs. John H. Culbertson, Michael T. Martin, and Nelson A. Rockefeller, Jr., all of whom served with dedication, left the Board of Advisors with four va-

cancies. These were filled by Jane Alexander, who has given of her talents and time to many WCI efforts; Mrs. William C. Beutel, president of the Women's Committee for the past two years; Robert W. Kean, Jr., a supporter of several WCI initiatives; and Bradford D. Smith, whose particular interest is the Society's Wildlife Survival Center.

On the Board of Trustees, Richard I. Purnell and Michel C. Bergerac completed, respectively, 12 and 10 years of distinguished service. Joining the Board were John B. Hess and Mrs. Susan Lipton, a staunch supporter of Zoo Education.

Howard Phipps, Jr.

Report of the General Director



Saving wildlife, an intriguing experiment

On an island south of Savannah, Georgia, nineteen monkey-like Madagascan ring-tailed lemurs sun on the branches of a moss-bedecked live oak while five more, carrying new babies, rest in the palmettos at its base. Four miles south, a band of Indian lion-tailed macaques search the forest canopy for tender shoots and insects. Both troops are at liberty at the Zoological Society's Wildlife Survival Center on St. Catherines Island. The lemurs have roamed for five years, the macaques for five weeks. They are part of a fascinating experiment in conservation future-think.

Even as nature destruction increases, efforts to restore it quicken, but few resuscitated forests will regain their original complement of plants and animals. Those creatures fortunate enough to be candidates for reintroduction will usually face habitats quite changed from those in which they evolved; none more so than rain-forest-dwelling primates. Their reconstituted homelands will be undersized, their carrying capacity too low to assure unassisted viability in the face of the normal challenges of climatic variation (to say nothing of global warming), disease, ecological change, and

atypical competitors. Our wandering primates are teaching us about behavioral plasticity, adaptation—and environmental pitfalls.

The mortality which normally decimates each new cohort of young creatures seeking to win their place in "the wild" is enormous. The vast majority of wild animals born in nature never survive to reproduce. Successful reintroduction of species extinct in nature may require hundreds, even thousands, of animals (for example, in the peregrine falcon program). With larger or more specialized animals, such as the California condor and black-footed ferret, whose releases from zoo populations will soon begin, only constant monitoring, ongoing care, and supplementary feeding seem likely to effect success.

Very little is known about the restoration of captive bred primates to nature, yet no reintroduction effort is more intriguing, closer to home—or closer to what the New York Zoological Society does.

What the New York Zoological Society does

Encapsulating what the Society does in a single paragraph, a trustee-staff workshop recently wrote:

Alone among our planet's conservation organizations, NYZS combines a successful international conservation action and field science program with the direct propagation of endangered species and preservation of declining habitats, far-reaching education, training, and communications programs with wondrous living wildlife collections, all of which enhance people's understanding, appreciation, and concern for nature while enriching their lives. We save wildlife.

Living up to such a description is daunting. (Just try saying the first sentence without drawing breath!) But, as this *Annual Report* attests, the New York Zoological Society is unique. While its most public features are its two zoos and aquarium in New York, visited by 3,519,920 people last year, its education programs on wildlife conservation and ecology were utilized in 24 states and 6 foreign countries. Its field program, Wildlife Conservation International, conducted 132 conservation projects in 38 countries. Its magazine, *Wildlife Conservation*, reached thousands of readers. The Society's programs affected and taught untold numbers

of human beings—and cared for great numbers of other kinds of beings, in their homes and in ours.

No other organization so comprehensively embraces conservation's spectrum: from saving faltering species and their ecosystems to propagating creatures losing their habitats, caring for them, and presenting them to people. The Zoological Society is a genuine interface between our species and all the others.

Best of times, worst of times

NYZS conservationists were buoyed by successes in the gazetting of new wildlife reserves in three countries. They bred hundreds of vanishing animals in the living collections; made breakthroughs in laboratory, animal management, and field science; saw dozens of their recommendations for parks or wildlife protection start down the tortuous path of bureaucratic adoption and an impressive cadre of conservation trainees win degrees and positions of responsibility in their home countries. Major support for our overseas programs became available from USAID, the EEC and other granting agencies as awareness of the extinction crisis spread. And it did spread.

A constant drumbeat of environmental bad news, muted only by inadequate reporting, has assaulted our ears. Civil war affected WCI projects in Rwanda, Ethiopia, and Sierra Leone. Our Ethiopian facilities were badly damaged but local tribes rebuilt most of our Sierra Leone station of their own accord! Wildlife surveys and censuses throughout most of the world recorded the acceleration of environmental destruction and pollution, over-hunting, and falling wildlife populations. Nevertheless, there are no Cassandras working for the Zoological Society, declaiming that conservation is futile and extinction of everything wild inevitable—because it is not.

To save wildlife

How can wildlife be saved? It is tempting to succumb to despair—to make forecasts that everything will be gone by, say 2020. Or that the only useful conservation action is immediate control and reduction of human population (as it must be in the long run). Or, conversely, to create campaigns around dubious or pollyannaish maxims: "Save biodiversity through sustainable development." But more immediate action is essential, and possible. Human populations are already so large that the fate of most major wildlife populations is sealed, unless we act now, directly on their behalf. We

can't wait for the effects of better population policies or a panacea for poverty. The 30-year-olds of 2020 have already been born and wildlife conservation must address their environments—and admit that sustainable *utilization* in the service of biological conservation is more realistic than *sustainable development*.

Ultimately, conservation is in humanity's self-interest. No other routes to progress and survival are believable. Our task is to buy time, protect, provide facts, teach, give direction, dis-

pendence care, and impart inspiration—to act directly to save wildlife now. The New York Zoological Society is positioned to make a disproportionate contribution to that task.

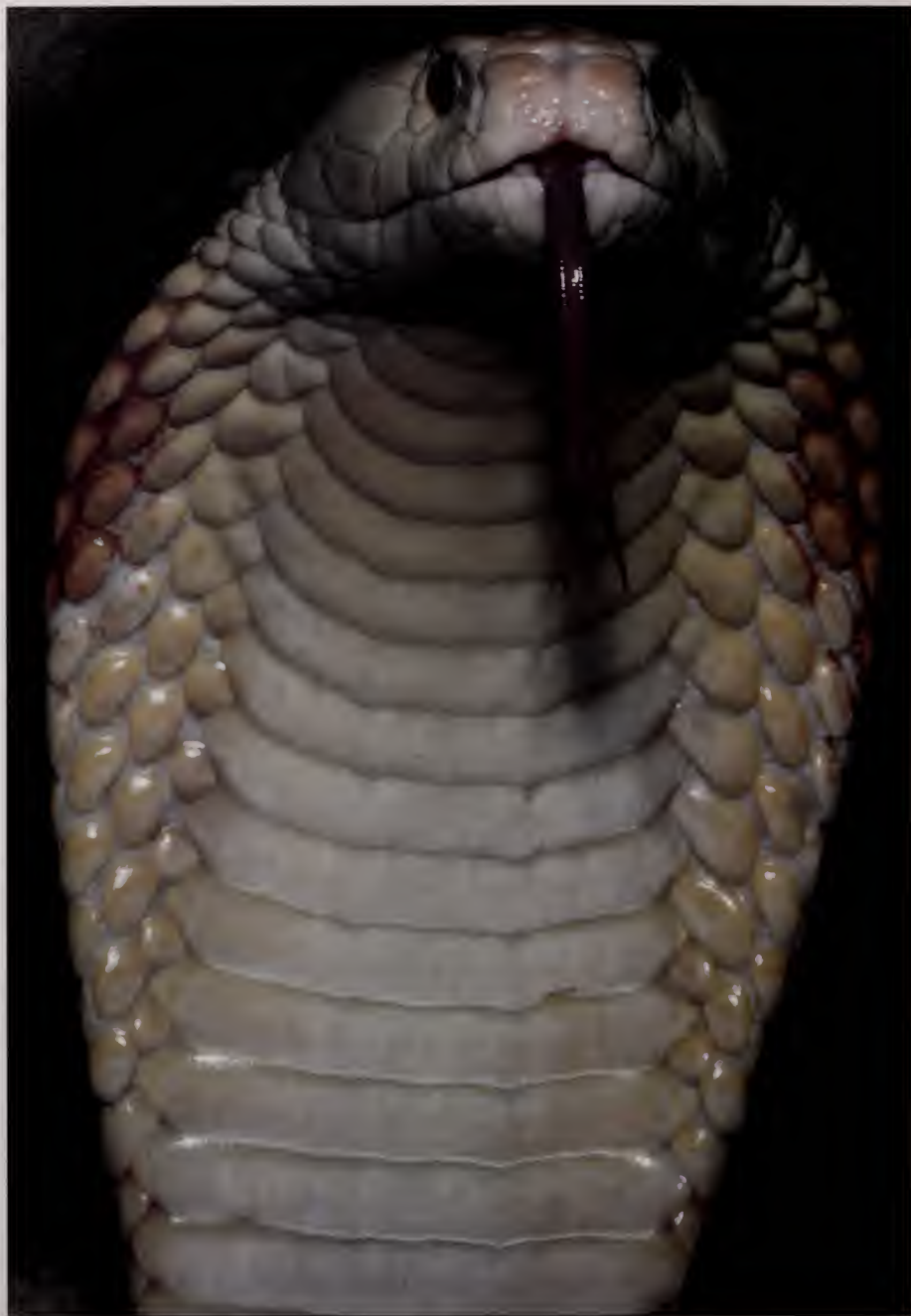
William Conway

Diminution of City Support

In late spring, New York City dramatically cut the 0.3 percent of its fiscal 1992 budget accorded to its 32 quasi-public cultural institutions. Irrefutable economic, public service, and contract arguments were unavailing. Nor did heart-warming public support for the Zoological Society, including nearly 150,000 signed petitions and countless letters, save the Zoological Park, Aquarium, and Central Park Zoo from cuts ranging from 24.6 percent at the Bronx Zoo to 58 percent at the Central Park Zoo.

Reductions in program and staff have been effected. A holistic reappraisal of how we can most effectively contribute to the quality of life for the people of our region and to the survival of life around the world is underway.

Postscript: The Society's leadership is engaged in a new and far-reaching effort to redefine NYZS directions so as to better contribute to the quality of life locally and the survival of life generally. The work is promising, its preliminary results powerful. They will be reported in 1992.



Albino Asiatic cobra at the World of Reptiles.

SANCTUARIES FOR WILDLIFE

How vanishing species are protected, propagated, and cared for at the Bronx Zoo, the New York Aquarium, the Central Park Zoo, and the Wildlife Survival Center. Reports on wildlife management, exhibition, and science, including the debut of the Baboon Reserve, Northern Ponds, and Hudson River exhibits; Katherine the koala; breeding rare pheasants; modernizing Reptile World; macaques on the loose; updating the marine sciences program; new quarters for the Biotelemetry Studies Unit.

Bronx Zoo Mammals

The first year of the Baboon Reserve and African Market, which opened on July 10, 1990, has proved an enormous success, for both the animals and human observers. Interaction between the two troops of gelada baboons, and between the baboons and Nubian ibex, has been entertaining, educational, and helpful to understanding group social dynamics in these species. A third species introduced during the spring—the rock hyrax—lives in the fissures and crevices of a rock outcropping near one of the visitor observation stations, though it has access to the entire exhibit.

The two groups of female geladas and offspring, each congregated around a single adult breeding male, duplicate the multi-levelled social organization of the species in nature. Conflict arises every day between the groups, but is expressed ritualistically, without threatening their coexistence. During the day, the rugged grassland environment provides a sanctuary for the two groups much like their own Ethiopian alpine habitat. At night, they sleep in separate quarters, as they might along the cliffs of their high homeland plateau. Observations and studies continue of group dynamics, reproductive behavior, and pat-

terns of foraging in the habitat.

In spring 1991 a special exhibit was set up in the Keith W. Johnson Zoo Center for the two-month visit of Katherine the koala, on loan from the Los Angeles Zoo before continuing on to settle at the Columbus Zoo. She was accompanied in the exhibit by videotapes describing koala behavior and underscoring threats to the koala's survival in its native Australia from disease and habitat destruction.

The challenge of Katherine's visit involved supplying her each day with enough eucalyptus, the only food she would eat. Arrangements were made with a Florida nursery to fly freshly cut eucalyptus to the Zoo twice a week. She was the first koala to appear at the Zoo in 70 years, and thousands of visitors came to see her. Some were even lucky enough to be there when she awoke to eat from her daily 18 hours of sleep.

Rapunzel the Sumatran rhino's arrival at the Zoo from Indonesia last year marked the beginning of the Society's active participation in an important international rescue program for this disappearing species. As co-chairman of the Sumatran Rhino Trust, the cooperative effort between the Indonesian government

and the Bronx, Cincinnati, Los Angeles, and San Diego zoos, General Curator James Doherty traveled to Sumatra to sign a new agreement with Indonesian wildlife officials that will help establish the Trust's breeding program.

Doherty also became co-chairman of the AAZPA's Cervid Taxon Advisory Group, a committee that will coordinate zoo management of the world's 39 deer species, and he was appointed to the board of the Rhino Taxon Advisory Group.

Curator Fred Koontz represented the Society on four trips abroad this year. He presented a lecture at the International Primatological Congress in Kyoto, Japan; taught in the Smithsonian Institution's Zoo Biology Training Course in Guadalajara, Mexico; consulted for WCI on methods of satellite-tracking forest elephants in Korup Forest, Cameroon; and evaluated black howler monkey conservation programs in Belize. With Drs. Bob Cook and William Karesh of Animal Health, he received a grant from the Institute of Museum Services to establish the Biotelemetry Studies Unit, which he heads. Dr. Koontz also became a member of AAZPA's Small Population Management Advisory Group, which will analyze the genetics and demographics of zoo animals.

Collections Manager Penny Kalk completed the AAZPA's Business Management School and published an important paper on animal marking methods. She also worked with the Animal Health Center to initiate a research program concerning contraception for exotic animals. Supervisor Patrick Thomas continued his doctoral research on social behavior and reproduction in gaur and co-authored a paper with Senior Keeper Kathy MacLaughlin for the

AAZPA Regional Conference on babirusa husbandry and biology. At the request of the small-clawed otter Species Survival Plan, Supervisor Claudia Wilson and Senior Keeper Kim Tropea prepared a publication on husbandry of this species, based on breeding success at the Bronx Zoo. Colleen McCann, a graduate student at the City University of New York, initiated a doctoral research project on social factors affecting reproduction in geladas at the Baboon Reserve.

Important mammal births were recorded for proboscis monkeys, Rodriguez fruit bats, snow leopards, silvery marmosets, cloud rats, silvered leaf monkeys, white-cheeked gibbons, Grevy's zebras, slow lorises, mouse lemurs, blesboks, slender-horned gazelles, California sea lions, saki monkeys, Père David deer, and American bison. Unusually beautiful tufted deer were added in Wild Asia, and became only the second collection of the species in North America.

Bronx Zoo Birds

Four pheasant species—mountain peacock pheasants, Malayan crestless firebacks, Malayan argus, and Malayan peacock pheasants—came to the Bronx Zoo as part of a collaborative effort with the Malaysian government to establish breeding populations of rare



Katherine the koala at Zoo Center.



Three cheetahs make their debut at the Carter Giraffe Building.

pheasants in Malaysia and the U.S. The program in northern Borneo will be set up by two members of the Sabah East Malaysian Wildlife Department trained for a month at the Bronx Zoo in captive management techniques.

In order to establish a captive group of Carmine bee-eaters in the World of Birds, nestlings were collected in Zimbabwe and brought to the U.S. for hand-rearing. The birds were successfully trained to eat a balanced diet without having to catch it on the wing. Four of them, the first of what is hoped to be a large and lively group, are now doing aerial acrobatics in the Bronx, but finding their food in a dish.

The hoatzins acquired from Venezuela last year continue to thrive, the first and only successful captive group of this species. They produced eggs in June, showing promise for breeding in the near future.

A group of ten Guira cuckoos from subtropical South America, reared in the Zurich Zoo, arrived in the spring and quickly became acclimated to their new home in the Arid Scrub exhibit. They have already built nests and are laying eggs. Other acquisitions include red birds of paradise from Jurong Bird Park in Singapore and two important pairs of Bali mynahs from the Jersey Wildlife Preservation Trust which are unrelated to birds in the U.S.

The department was asked to attempt breeding the only unrepresented founders of the Guam kingfisher and the Guam rail, which had failed to breed elsewhere. The program was a success for both species, and several of the young rails from these genetically important parents were sent to the Pacific to join others in the release program on Rota Island near Guam.

Other significant hatchings included blood pheasants, white-naped cranes, lesser and red birds of paradise, Blyth's tragopans, and argus pheasants.

Research using a telemetric egg to transmit from a white-naped crane's nest has provided more information on nesting behavior. Transmitters are also

being tested for use in tracking Bali mynahs released in the wild. Behavioral studies of scarlet ibises and boat-billed herons were begun with the goal of improving our knowledge and management of these colonially nesting birds.

Chairman Dr. Donald Bruning campaigned actively during the year to produce national and state level legislation to restrict the importation of wild birds caught for pets. He worked on cooperative programs with

Malaysia on rare pheasants, with Papua New Guinea in creating reserves and a research institute, and with Indonesia in monitoring the Bali mynah breeding

and release program. Ending two terms as chairman of AAZPA's Wildlife Conservation Management Committee, he was elected to their Ethics Board and continues as a member of the Clearinghouse Committee. He ended his term as chairman of the ICBP-IUCN/SSC Parrots Specialist Group, and is working on the production of a third parrot poster, this one for cockatoos. With Siti Hawa of the Malaysian Wildlife Department, he was named co-studbookkeeper of the Rothschild, or mountain peacock pheasant. The first studbook for the Malayan peacock pheasant was published this year.

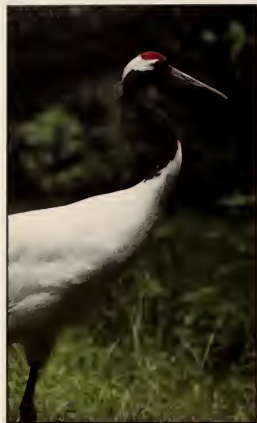
Wildlife Census

On December 31, 1990, 8,963 wild animals of 1,141 species were being cared for at NYZS facilities—the Bronx Zoo, the New York Aquarium, the Central Park Zoo, and the Wildlife Survival Center.



Guira cuckoos paired off quickly at the World of Birds.

Curator Dr. Chris Sheppard coordinated the pilot acquisition of Carmine bee-eaters and has been working to refine the teaching of aviculture to the staff. As a member of the Captive Breeding Specialist



*Red-crowned crane
at Northern Ponds.*

Group and co-chair of the Taxon Advisory Group for parrots and hornbills, she helped prepare a status summary of the world's parrots and is organizing a conservation action plan conference for hornbills in Singapore this fall. As part of the AAZPA bird curators caucus, she developed a computer entry screen to survey available propagation and exhibition space for birds in zoos. She

is a member of the AAZPA Conference Program Committee and chairs the Species Survival Program and Taxon Advisory Group for cranes.

Curatorial Intern Annarie Lyles was named studbookkeeper for the scarlet ibis and will direct the Taxon Advisory Group for Ciconiiformes. She is also coordinating the creation of an operations manual for the department, and is heading the organization of an AAZPA workshop on managing colonial waterbirds.

Bronx Zoo Reptiles and Amphibians

Like its scaly inhabitants, the 92-year-old Reptile House shed its outdated exhibition skin and emerged, on June 13, as the World of Reptiles with a bold new graphics program, hands-on interactive videos, special displays, and unusual acquisitions for the animal collection. Cherry-wood trim, wall carpeting, and a pair of life-size bronze Galapagos tortoises helped transform the setting for the building's 50 exhibits, including several new ones. Added were Parson's chameleons from Madagascar (the world's largest chameleon), matamata and endangered red-headed Amazon sideneck turtles, a 160-pound alligator snapping turtle from the St. Louis Zoo, and a thirteen-foot,

650-pound male Malaysian false gharial with his ten-foot mate.

The World of Reptiles exits onto a renovated New York Marsh, now doubled in size and spanned by a 40-foot bridge that offers an unusual view of local turtles, bullfrogs, and their natural habitat. During the six months that the building was closed for renovation, Curator John Behler wrote more than 100 theme labels and interpretive graphics, and the Herpetology staff worked closely with the Exhibition and Graphic Arts Department in refurbishing and creating new exhibits.

As work progressed in the World of Reptiles, the newly exhibited Amazon red-headed sideneck turtles produced seven offspring, and the rarely exhibited Australian giant sideneck turtles ten. Other first-time captive hatchings included eleven Bornean giant river turtles in JungleWorld, from a female on loan from the Columbus Zoo, and a single Namaqualand speckled padloper (the world's smallest tortoise) from a



Parson's chameleon snares a mealworm.

single-egg clutch laid by a newly acquired specimen.

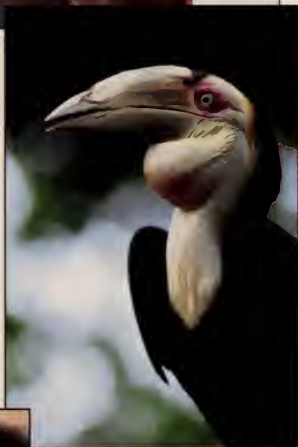
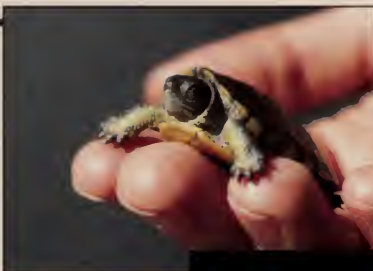
Other notable hatchings and births included more than a thousand New Guinea giant tree frogs, two dozen green-and-black poison dart frogs, as well as blue poison dart frogs, Surinam toads, broad-snouted caimans, dwarf caimans, Chinese alligators, Coahuilan box turtles, Vietnamese box turtles, spotted turtles, wood turtles, New Guinea snakes turtles, an alligator snapping turtle, radiated tortoises, red spitting cobras, and Standing's day geckos.

A male and two female Chinese alligators from the Moscow Zoo joined the collection as part of the SSP breeding program for this species, and ten

International Rescue Programs

NYZS animal departments at the zoos and aquarium lead and participate in hundreds of breeding exchanges and cooperative programs with other zoos, aquariums, government agencies, conservation groups, and zoological institutions. Many of them involve international efforts to breed endangered species and restore them to their homes in nature. Here are some of the current programs and actions.

- **Sumatran Rhino Trust**—Bronx, Los Angeles, San Diego, and Cincinnati zoos and Indonesian government—breeding agreement.
- **Black howler monkeys**—advice from Mammal Department on conservation in Belize.
- **Lion-tailed macaque and ring-tailed lemur**—release programs on St. Catherines Island for application later in India and Madagascar, respectively.
- **Rare Asian pheasants**—Bronx Zoo and Malaysian government breeding agreement for birds in Sabah, Malaysian Borneo.
- **Guam rail and Guam kingfisher**—interzoo breeding program for species extinct in nature, leading to release on the Pacific Island of Rota.
- **Bali mynah**—breeding at the Bronx and other zoos for release on Bali, Indonesia.
- **Hornbills**—Conservation Action Plan conference in Singapore.
- **National and state legislation banning the importation of exotic birds.**
- **Marine turtles**—Global Action Plan for the world's 260 species by the International Union for the Conservation of Nature (IUCN).
- **Coahuilan box turtles**—Breeding at the Bronx and Gladys Porter zoos for release in Mexico.
- **Desert fish**—New York Aquarium and Autonomous University of Nuevo Leon, Mexico—breeding and release program.
- **Beluga whales**—Aquarium, Canadian government, and Woods Hole Oceanic Institute—various aspects of breeding and identification.
- **International Coral Reef Research and Conservation**—collaboration between Aquarium-Osborn Laboratories of Marine Sciences and WCI, for breeding and research.



Top: Coahuilan box turtle baby.

Above: Wreath-billed hornbill.

Left: Lion-tailed macaque.

Below: Sumatran rhinoceros.



John Behler and Herpetology staff greet children at reopening of World of Reptiles.

Solomon Island leaf frogs were received from the Woodland Park Zoo in Seattle.

For years the Bronx Zoo and Gladys Porter Zoo in Brownsville, Texas, have successfully bred the Coahuilan box turtle. In January, curators from both zoos and U.S. Fish and Wildlife Service personnel traveled to Cuatro Ciénegas in Coahuila, Mexico, to discuss reintroducing this endangered species in the unique basin that has the highest rate of endemic species in North America. The program would also involve monitoring the turtles through radiotelemetry and educating local people about wildlife in the area.

Curator Behler was appointed chairman of the IUCN/SSC Tortoise and Freshwater Specialist Group, an organization of more than 100 chelonian experts who have been charged with implementing a global

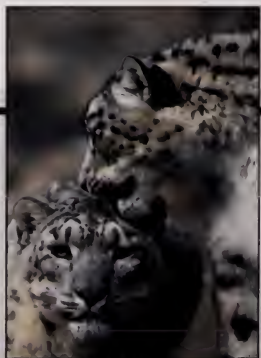
conservation plan for the world's 260 non-marine turtle species. He continues to coordinate the AAZPA Crocodilian Advisory Group, and has been invited to join the IUCN Madagascan Reptile and Amphibian Specialist Group. As administrator of the Nixon Griffis Fund for Zoological Research, Behler has overseen the awarding of more than \$200,000 in 76 grants since 1985. Behler is species coordinator and stud-bookkeeper for the Chinese alligator, while Superintendent William Holmstrom serves in the same capacity for the Madagascan radiated tortoise.

Wildlife Survival Center

In May 1991, a group of ten lion-tailed macaques began their gradual acclimation to a home site on the south end of St. Catherines Island. Now free-ranging, the macaques calmly forage through the live oak canopy for skinks, acorns, muscadine grapes, and Spanish moss. They still return daily to the home base for yams, fruit, monkey chow, and a close-up check by keepers to monitor progress of the release project. The experience of testing novel food resources, using natural vegetation for climbing (they need to know what a dead branch is), and being distanced from humans will make the macaques born to this troop candidates for reintroduction to the Western Ghats of India, where the species has been reduced to about 4,000 animals by hunting and habitat loss.

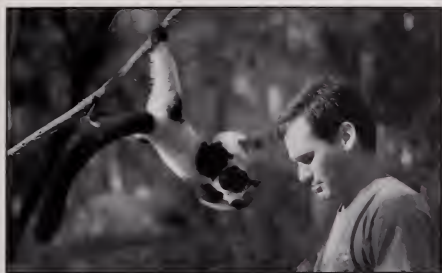
Other free-ranging projects prospered. Five ring-tailed lemurs were born to five different females, the greatest number of mothers in a single year since the project began in 1985. One pair of ruffed lemurs roaming St. Catherines produced and raised a set of twins.

A Malayan wreath-billed horn-



Because our institutions focus on life and its diversity, they are, unavoidably and irrevocably, concerned with the future; with posterity and perspective. They have to be forward-looking, hereafter and henceforth, anticipatory, futuristic organizations. This fact constitutes an overwhelmingly fundamental difference between museums which deal with things that are alive and those that do not.

William Conway
General Director



Zoologist Jeff Spratt greeted by ruffed lemur in release program.

bill chick hatched and fledged during the spring months, the first large hornbill to do so at St. Catharines. The laborious process began in February, when the female sealed herself into a tree hollow with food, feces, and rotting wood. In the dark nest chamber, she laid and incubated her egg and was fed (later with her chick) through a slit by her mate for 131 days with fruits, mice, and feline diet.

Hatching highlights in the bird collection included one wattled crane, eight yellow-knobbed curassows, one maleo, three Leadbeater's cockatoos, and four red-fronted macaws. Newly acquired were ten buff-naped ibises, two lesser adjutant storks (both comprising the only potential breeding groups in the country), four Blyth's hornbills, and three white-winged wood ducks.

Significant mammal births included five Jackson's hartebeests in the only viable group of this species outside its Kenyan homeland, two sable antelopes, seven slender-horned gazelles, two Nile lechwe, and four Grevy's zebras.

New staff workspace was completed during the year, particularly for laboratory analysis and animal treatment. A new centrally located commissary and brooder building facilitates routine diet preparation and chick rearing.

New staff members at the Center are Eugene V. Kment, formerly of Sea World in Ohio, as assistant curator of birds, and primatologist Lydia Flewelling, who is studying the free-ranging lion-tailed macaques to complete requirements for a master's degree from the University of Florida. Named as mammalogist was Daniel Beeram, recent recipient of a master's degree in reproductive biology and previously a supervisor at the Louisiana Purchase Zoological Gardens.

New York Aquarium

The Aquarium and Osborn Labs reorganized to move toward a more coherent program of conservation, education, and research, reflecting changes in the overall mission and international leadership role of the Zoological Society. The Animal, Education, and Exhibition and Graphics Arts departments were combined into a single Aquarium division under new Associate Director Dr. John Nightingale. The departments will work more closely together in using the Aquarium's resources to save wildlife and disseminate knowledge.

Two important conservation projects were begun during the year. An agreement was signed with the Autonomous University of Nuevo Leon to collaborate in establishing a captive breeding program for critically endangered desert fish of Mexico. In March, the Aquarium received founder stock of the El Potosi dwarf pupfish, which was recently declared extinct in nature. They have since been successfully bred, but to save the species will require restoration of its habitat and raising public awareness. Serving the latter purpose is Desert Spring, a new exhibit for the Monterey platy and the golden sawfin, two Mexican desert fishes whose habitats no longer exist.

The breeding of cichlids from Lake Victoria in Africa expanded with the first North American hatchlings of *Haplochromis (Ptyochromis) sauvagei*, a snail-eating haplochromine now extinct in nature. The Aquarium continues to maintain two undescribed Lake Victoria cichlids, *Haplochromis* "Small-spot," another mollusc-eating species, and *Haplochromis* "Cross-dresser," a generalized insectivore. Also recorded was the first spawning of a cichlid from the West African rain forest, *Tilapia brevimanus*. Though the species is not yet officially listed as threatened, it must be considered at risk due to the accelerating human impact on its habitat.

A frequently embattled habitat closer to home is celebrated and explored in a new exhibition called The Hudson River, which opened on June 21, 1991. Jointly funded with the Hudson River Foundation, the exhibit replaces the Freshwater Gallery that was originally built in 1971. The large 29,000-gallon Gulf Stream tank (the old Bermuda Triangle exhibit) houses representative species that are carried north from tropical waters up to the river's mouth in the summer. Three tanks are devoted to the brackish New York

Harbor area, the tidal freshwater portions of the river near Poughkeepsie, and the cool, fast-flowing streams of the river's source in the Adirondaks. A fifth tank has exotic animals and plants that have been introduced into the Hudson.

Across the corridor is a 50-foot-long map showing points of interest along the Hudson, with emphasis on the interaction of people and the river, including both benefits and environmental problems.

Another new exhibit, serving as the centerpiece for Pharmaceuticals from the Sea, opened in June in the storefront area of Discovery Cove. Featured are leeches, which are used in plastic surgery and limb reattachment, and horseshoe crabs, whose blood is used in tests to detect bacterial contaminants in food, cosmetics, and other products.

Work on Sea Cliffs, stretching more than 100 yards along the boardwalk, continued on schedule toward the exhibition's 1992 opening. The coastal habitats and interior exhibits were begun, and the first animal acquired for the complex, a northern fur seal, arrived from the Seattle Aquarium. An additional holding pool was constructed to accommodate animals before Sea Cliffs is ready.

Renovations included sandblasting the Aquatheater and repairs to the Shark Tank, where skylights were added to create a greater sense of natural light. During the process, surplus sand-tiger sharks were sent to the Tokyo Sea Life Park.

Three harbor seals were obtained from the Northwind Institute, which was unable to continue their care. Rasal, Sirius, and Stanley were originally rescued as stranded pups from the coast of Maine. Another harbor seal, Luke, was transferred to the Philadelphia Zoo, and a beluga whale, Sikku, was returned to the National Aquarium. Sikku had been on loan in

New York while a new complex was being built in Baltimore.

Belugas were the subject of two cooperative projects. The Canadian Government continues to monitor the Aquarium's belugas, while I.D. bracelets are being tested that may prove useful for field iden-



Students from PS 303 at the Aquarium's new Hudson River exhibit

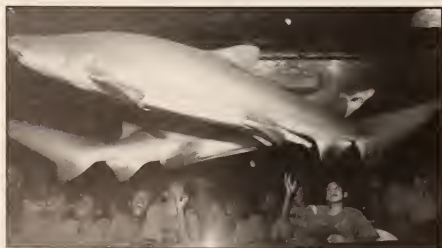
tification applications. A researcher associated with the Woods Hole Oceanic Institute is studying the sounds produced by our belugas in an attempt to identify individual "signature" whistles and also to correlate sounds to behaviors. Meanwhile, two of the belugas, Cathy and Natasha, were pregnant and scheduled to give birth during the summer.

Breeding is also planned for Nuka, the Aquarium's female walrus, who will be transported to Sea World in Florida in a new, specialized truck. This vehicle has equipment for stranding and collecting activities as well as a stainless steel transporter for the walrus.

Keeper training was inaugurated at the Aquarium, based on the program used at the Bronx Zoo, and will become a regular part of staff development. Sessions were led by Aquarium management and Bronx Zoo staff.

Osborn Laboratories of Marine Sciences

The research programs were redefined to encompass three major new initiatives. International Coral Reef Research and Conservation, the first of these to be implemented, is a collaborative effort involving the Society's field division, Wildlife Conservation International, the Aquarium, and OLMS.



Two sand sharks and campers from inside the tank.

Coral reef field studies are already the focus of major WCI research and conservation projects on the Belize Barrier Reef in the Caribbean and along the Indian Ocean coast of Kenya. One marine park has been established on the Belize reef, and a larger one is being planned.

Also underway are laboratory culture research on more than 30 species of coral at OLMS. One of the goals here is to improve the breeding of corals so that they can be made available to researchers in the New York Area.

The third element of the coral reef initiative involves the dissemination of information and educational programs. Permanent coral reef displays and temporary exhibits, Aquarium classes and symposiums on coral reef conservation, and new attempts to reach the public through the media will help to raise awareness about these poorly understood organisms and habitats.

Finally, OLMS will participate in an international consortium of organizations concerned with coral reefs. It will work to develop a cohesive worldwide framework for research and a means of instituting successful conservation policies.

Aquarium Sciences and Local Environmental Monitoring are the other two



Assistant Curator Dennis Thoney is involved in the wide-ranging new coral reef initiative at OLMS.

components of the new OLMS program. The former, involving the Aquarium's Animal Department, will be concerned with research on the propagation of aquatic animals, and on nutrition and diseases. The latter will focus on the effects of pollution and other environmental disturbances on marine animals in the estuarine system around New York City. Both programs will involve researchers at local colleges and universities.



Emerald tree boa baby and its mother at the Central Park Zoo.

Central Park Zoo

The 195 births and hatchings in 1990 reflected in particular the amazing diversity of species in the Tropic Zone. Born or hatched were a black-and-white colobus monkey, 81 green-and-black poison dart frogs (a threatened species breeding for the second year), and a number of tropical birds, including red-throated parrot finches, turquoise tanagers, and red-legged honey-creepers.

Among the snakes, the rock pythons, emerald tree boas, green tree pythons, and Amazon tree boas all produced young. Most fascinating for the public, perhaps, was a ten-foot-long Asian rock python, who laid her first clutch of eggs in March 1991. During the three-month incubation period, she coiled her body around the clutch, repeatedly contracting her muscles to create the heat needed to warm the eggs. Probes mounted in the exhibit allowed visitors to compare the temperature of the eggs with that of the surrounding air.

In the Central Garden, a sea lion was born, and in the Polar Circle, both the puffins and the gentoo penguins hatched chicks for the first time. The zoo's facilities for tamarins were completely renovated to accommodate a breeding program for highly endangered golden-headed lion tamarins.

An exhibition of color photographs by NYZS General Director William Conway, titled "Harsh Habitat, Tough Animals," was mounted in the Zoo Gallery. The photographs represent Dr. Conway's many years of study and work on behalf of preserving the coastal wildlife of Patagonia in Argentina. An exhibition on the "Illegal Skin Trade," alerting consumers to the threats facing endangered reptiles, ended

its run in the Wildlife Conservation Center.

In December 1990, the Public Affairs Department organized the first "Winter Weekends," promoting the zoo as an all-weather haven for New Yorkers during the hectic holiday season. Media highlights included a major story in *The New York Times* about the "new" zoo, as well as national coverage of the "Illegal Skin Trade" exhibition. During the New York City budget crisis in spring 1991, the zoo's efforts to remain open garnered media coverage from all local press, national networks, and a host of foreign press, including television and print journalists from Germany, Italy, Japan, Spain, South America, England, and France.

Queens and Prospect Park Zoos

Construction was nearly complete on the renovation of the Queens Zoo of North American Animals in Flushing Meadows Park. Discussions with the City were initiated to set an opening date for the zoo, but operating funds had yet to be allocated by the City government.

At the Prospect Park Zoo, reconstruction was nearing the halfway point. Two new buildings will house administration, education, and animal health. A large pole barn being built in the pasture area will bring visitors into contact with domestic animals.

Naturalistic open exhibits, including a prairie dog town, a meerkat burrow complete with termite mounds, and a large baboon savannah landscape, are being created by California exhibit contractor David Manwarren. Painter Gilbert Rioux, who worked on several Central Park Zoo murals, completed a coniferous forest scene as the backdrop for the saw-whet owl, an Australian grassland vista for the parakeets, and a jungle forest floor for the jungle fowl.

Exhibition and Graphic Arts

After a year of habitation by gelada baboons, Nubian ibex, Abyssinian blue-winged geese, and, more recently by rock hyrax, the Baboon Reserve has proved to be an unusually effective wildlife landscape. The largest primate exhibit in any U.S. zoo, it is also spatially complex in a way that allows the animals to function as in nature and permits visitors to observe their behaviors quite naturally along a variety of sight lines. Social behavior, particularly in the geladas, has

evolved during the year. Refinements in the exhibit included the addition of rockwork for shade and heat pads for use in colder weather.

The educational and participatory aspects of Baboon Reserve and the adjacent African Market have also been highly successful. Studies have shown that visitors stay in the area for extended periods of time, looking at the animals and exploring the total environment and its lessons about evolution and conservation. Already, question-and-answer "flip graphics" have replaced two-dimensional signage in observation stations to involve the viewer more immediately in learning. A special study guide, *Exploring Africa*, is being prepared by the Graphics and Zoo Education staffs for use by junior and senior high school classes in the Charles W. Nichols, Jr. Africa Lab, the on-site classroom.

Spurred by the success of Baboon Reserve, the department has begun planning for another major primate exhibit—the Great Gorilla Conservation Project. The lowland gorilla's lush domain will also include other animals of the African forest, with emphasis on a varied habitat for social groups of animals and on the conservation of these threatened species through breeding and the support provided by education and public awareness. The Forest is being designed as an international center for saving the gorilla's increasingly exploited habitat.

Nearing its 20th anniversary, the Lila Acheson Wallace World of Birds will undergo major renovations, thanks to the Reader's Digest and Lila Acheson Wallace funds. Technology that has evolved so rapidly in recent years will strengthen the facility's exhibition



Trumpeter swans in the newly landscaped Northern Ponds.



Don O'Leary, Ron Davis, and Chris Maune work on Magellanic penguin graphics for WCI's Punta Tombo station in Argentina.

and conservation programs. Already, new murals have been created for the northeastern woodland habitat and a Venezuelan mountain slope exhibit, where a huge fallen tree laden with epiphytes and tropical vines will provide optimal perching and nesting for highly endangered helmeted curassows.

The initial phase of renovation, as planned by the curatorial and exhibition staffs, with outside consultants, will improve the building's public spaces with new floor and ceiling surfaces, new railing designs, and larger exhibit fronts to increase viewer involvement. New exhibits and graphic programs will then be introduced stressing breeding and other conservation efforts. Plans for major off-exhibit propagation and greenhouse support facilities have been completed.

At the 92-year-old Reptile House, the first phase of long-term renovation was completed in June 1991. It was primarily a chance to begin experimenting with new exhibition devices, techniques, and materials. Thousands of square feet of carpeting and acoustical wall fabric were installed along with a new system of back-lighted labels and photographs in cherry-wood cabinets. Many of the

planned 100 interpretive signs are in place. Educational visitor-activated videos with multiple programs in the new swamp exhibit for matamata turtles, vine snakes, and Parson's chameleons have elicited enthusiastic response from visitors. Outside, horticulturists and designers worked with construction crews to strip expanses of old asphalt paving, expose native bedrock, and create an exit wetlands exhibit—the New York Marsh.

Northern Ponds, a much larger wetlands environment for trumpeter swans, red-crowned cranes, and northern waterfowl, replaced the old Holarctic Tarn. Loyal members on Spring Clean-up day joined exhibition and horticulture crews to create beaver dams that tell the story of a habitat's natural changes. Telescopes can be directed to loafing logs, nesting islands, and snags used by wildlife. A small peat bog supports pitcher plants, bog rosemary, and other plants characteristic of a peaty backwater created by beaver flooding.

Also completed during the year were new exhibits in the Children's Zoo for wallabies and lemurs, funded by the Hayden Foundation, and a temporary eucalyptus grove in Zoo Center for Katherine, the visiting koala. Reconstruction of the Elk Range, funded

largely by the City of New York, will begin in fall

1991, and a master-plan for redevelopment of the wooded valley north of the Aquatic Birds House as a major wetlands area for rare flamingos, ibis, storks, and other colonial waterbirds was begun with backing from the Annie Laurie Aitken Charitable Trust.

Endangered Species

About 28 percent of the Society's wildlife population—2,550 animals representing 330 species—is endangered, threatened, vulnerable, or even extinct in nature. Breeding produced 450 offspring of these species. The Society participates in 36 of the 54 AAZPA Species Survival Plans.



Lesser mouse lemur

Hundreds of signs and interpretive graphics were installed for the year's major new exhibitions and the new Recycling Center; others were redone for wildfowl, African antelopes, and JungleWorld. New press paper innovations, posters, and educational materials were also designed.

In addition to maintaining the Zoo's thousands of trees and working on major new exhibitions and renovations, the Horticulture Department initiated a plant nursery that will grow vegetation to be used in the planned Great Gorilla Forest. Hard-to-find bamboos, giant-leafed magnolias, and unusual hardy members of the tropical rubber tree, ebony, and fig families will contribute to a lush viney Equatorial African forest.

With aid from the Norcross Wildlife Foundation, plans for an energy-efficient greenhouse were developed and growing seasons were extended for the production of green browse. The feasibility of zoo horticulturists participating in endangered plant propagation was explored under the Horticulture Research Partnership funded by the Leon Lowenstein Foundation.

Better Homes and Gardens

New exhibition, breeding, and conservation centers completed or underway during the past year at NYZS facilities.

Bronx Zoo.

Baboon Reserve-African Market (opened July 10, 1990): Five acres simulating high-altitude Ethiopian grasslands adjacent to African village and public plaza in Somba style of architecture—gelada baboons, Nubian ibex, rock hyrax, blue-winged geese—Charles W. Nichols, Jr. Africa Lab for on-site classes.

Northern Ponds (opened June 21, 1991): Two acres—two ponds divided by beaver dam—trumpeter swans, red-crowned cranes, northern waterfowl.

World of Reptiles (opened June 13, 1991): Interior renovation of 1899 building—new graphics, video interactives, wall-carpeting—new exhibits for Parson's chameleons, mata mata turtles, false gharials—expanded outdoor New York Marsh.

Children's Zoo, Wallaby and Lemur Exhibits (opened March 29, 1991): Habitats in the Locomotion area, with participatory devices to demonstrate movement.

Lila Acheson Wallace World of Birds (in progress): Renovation of habitat exhibits, graphics, and public spaces in 1972 building to emphasize conservation and breeding—new propagation facilities and greenhouse.

Old Large Bird House (in progress): Renovation of 1905 building on Astor Court to accommodate Public Affairs, Financial Services, and other administrative offices.

World of Darkness (in progress): Renovation of interpretive graphics and exhibits.

New York Aquarium.

The Hudson River (opened June 20, 1991): Five aquatic habitats and a panoramic map devoted to life in the river, from its Adirondack source to New York Harbor.

Desert Spring (opened spring 1991): Rare Mexican desert fish—part of a breeding program for endangered species.

Sea Cliffs (in progress): Panoramic complex of coastal habitats for walruses, fur seals, harbor seals, sea otters, and black-footed penguins—above-water and below-water viewing with accompanying exhibits on ecology, conservation, and associated species.

Prospect Park Zoo (in progress).

Transformation of the outmoded zoo into a super children's zoo, with areas devoted to Animal Life-styles, Animals in Art, Pet Center, World of Animals (defenses, food and feeding, locomotion, and adaptations), and other exhibits.

Queens Zoo (in progress).

Renovation focusing entirely on North American wildlife and its preservation—California sea lions, American bison, red-maned wolves, river otters, black bears, raccoons, aviary.



Baboon Reserve, Bronx Zoo

Animal Health

Expanded efforts in vaccination and parasite control highlighted the department's emphasis on preventive medicine. Clinical emergencies handled by Drs. Bob Cook, Bonnie Raphael, and Paul Calle were mercifully few during the year. Treated successfully at the Bronx Zoo were an adult giraffe with a gastrointestinal infection, a pudu with a severe abdominal infection, and a Sarus crane and a Salvator water monitor, each with a fractured leg. Envisan, a human burn treatment recommended by surgical consultant Dr. James Grillo, was used effectively for the pudu's ailment.

At the Aquarium, Starky, a female dolphin, was treated for chronic gastrointestinal illness with a new medication suggested by Dr. Lin Klein of the University of Pennsylvania Veterinary School. Newfy, the adult male beluga whale, rebounded from last year's life-threatening kidney illness to impregnate two of the female belugas, Kathy and Natasha, according to blood tests. In May, Dr. Calle joined Laboratory Manager Catherine McClave and Curator Paul Sieswerda for a week of sea otter training at the Monterey Bay Aquarium in California, preparing for the arrival of this species prior to the opening of Sea Cliffs.

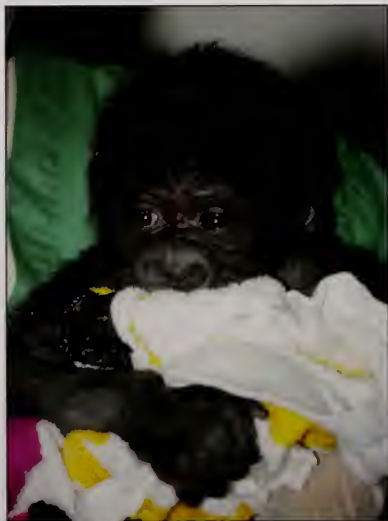
Several clinical consultants provided expert help during the year. Dr. Susan Kirschner, a veterinary ophthalmologist at the Animal Medical Center, treated eye conditions in Nuka, the Aquarium's Pacific walrus, and a Mongolian wild horse at the Bronx Zoo. A team from the University of Pennsylvania Veterinary School led by Dr. Pat Sertich, assisted in the evaluation of the reproductive status of Mongolian wild horses and Malayan tapirs. Dr. Grillo continued 17 years of medical and surgical consultation and helped secure the donation of a CO₂ laser and operating microscope from Roosevelt Hospital. Neurologist Dr. Stephen Grenell consulted on a number of primate medical problems. Pediatric surgeon Dr. Charles Stoller of Columbia Presbyterian Hospital, pediatric gastroenterologist Dr. Joseph Levy of Cornell Medical Center, and pediatrician Dr. Stephen Schwartz helped with the health program for the Zoo's baby gorillas.

Breeding was the focus of several clinical projects. Semen from Eld's deer was successfully frozen for use in future insemination, and Dr. Raphael assisted Dr. JoGayle Howard of the National Zoo and the

Bronx Zoo's Mammal staff in performing the first successful intra-uterine insemination on an exotic felid, in this case a leopard cat. Dr. Calle worked with Dr. Jay Kirkpatrick of Eastern Montana State College on a revolutionary new contraceptive vaccine first devised by Dr. Kirkpatrick, one of several techniques being developed for selective breeding.

In October, Dr. Cook coordinated a Spanish-language workshop for Latin American veterinarians, the first of its kind, preceding the Annual Conference of the American Association of Zoo Veterinarians. A manual was produced in Spanish detailing techniques in surgery, parasitology, hematology, and immobilization. Dr. Cook completed his term as editor of AAZV's *Journal of Zoo and Wildlife Medicine*, to be succeeded by Dr. Raphael.

The Biotelemetry Studies Unit was established with a grant from the Institute of Museum Services as a team of ten NYZS staff scientists and keepers headed by Mammalogy Curator Dr. Fred Koontz, International Field Veterinarian Dr. William Karesh, and Chief Veterinarian Dr. Cook. The Unit's electronics laboratory was near completion as part of the new Emil Dolensek Research Suite. Members of the Unit are currently studying white-naped crane



Pediatric checkup for a baby gorilla.

incubation, transmitters for tracking Bali mynahs and forest elephants in the wild, ovulation in gaur (Asian wild cattle), and thermoregulation in large lizards. Field biotelemetry methods are being tested in the more controlled zoo environment for WCI scientists.

In the second year of the International Field Veterinary Program, Dr. Karesh completed his genetics work with orangutans in Sumatra and Borneo and began to study potential disease transmission between humans and primates in a national park in Sarawak, Borneo. He worked with Dr. Koontz on forest elephant tracking in Cameroon, with Drs. John and Terese Hart on okapi and duikers in Zaire, and with Dr. Cook on a comprehensive study of the six duiker species in Zaire's Ituri Forest.

Okapi feed plants gathered in the field and duiker blood and duiker blood vitamin-mineral levels were analyzed to establish the optimal feeding management of these species.



Dr. Paul Calle helped develop contraceptive vaccine for selective breeding.

The Nutrition Program, under Dr. Ellen Dierenfeld, also received field samples of plants eaten by gorillas, proboscis monkeys, and Mongolian ungulates.

Avian diets at the zoos and aquarium were the focus of nutritional review. Appropriate vitamin products were developed for fish-eating species based on analyses of whole fish by Nutrition Technician Marianne Pennino and of feed intake and supplementation by keeper staff. Ground crabshell (chitin) was added to the diets of ant-eating specialists and other species based on studies of insect and crustacean exoskeletons. Dietary appraisals of giant pandas and cheetahs provided important data for their management.

Dr. Dierenfeld's well-established research on vitamin E brought her requests to lecture, write a

book chapter, and co-chair an international symposium. Future thrusts for the Nutrition Program will include mineral analyses using an atomic absorption spectrometer recently provided by the Perkin Fund and investigation of the effects of Betacarotene on immune function and reproduction.

The two-year project to upgrade and expand computer database storage for nutrition, clinical studies, clinical laboratory data, and pathology was completed by Computer Programmer Stephen Porter in 1991. Friends of the Zoo volunteers continue to enter data into the computer system. In the Pathology Program, the more powerful program has made possible the rapid retrieval of information dating back 20 years.

Pathology can now make rapid cytologic exams of clinical and necropsy materials to aid in the diagnosis of disease. The tissue library continues to grow, and a new ultra-low freezer enhances the frozen tissue library for future study. Comparative sets for teaching now number 300 tissue slides, accompanied by pertinent reference material and information. In her sixth year as pathologist, Dr. Tracey McNamara was named the Schiff Family Distinguished Scientist in Wild Animal Pathology.

New equipment donated by corporations, working with Dr. Cook and Executive Manager of Foundation and Corporate Support LuAnn McGrain included a xenon light source and medical endoscopes from the Olympus Corporation; an Ektachem clinical blood chemistry analyzer from Kodak; an intravenous infusion pump from IVAC for supplying exact quantities of fluids and medications to critically ill patients; and pharmaceuticals from Pfizer, E.I. DuPont De Nemours, Burroughs Wellcome, Hoechst Celanese, and Upjohn. Generous donors helped acquire a new Zeiss microscope for the clinical laboratory, Pathology's ultra-low freezer, darting equipment for the safe immobilization of animals, and a laparoscope for surgery.

Animal Management Services

In the Conservation Genetics Program, sponsored currently by the Charles E. Culpeper Foundation, research on the relationships among species and subspecies of rhinoceros included the first analysis of Sumatran rhino genetics, conducted by George Amato. Using the polymerase chain reaction (PCR)

technique, Amato successfully isolated and amplified DNA from Sumatran rhino hair samples. Further analysis at the DNA level will provide data on the degree of relatedness among the three geographically isolated subspecies in Sumatra, Borneo, and Malaysia, with critical implications for their future genetic management.

The Sumatran rhino is one of several Species Survival Program (SSP) animals the genetics program has been asked to investigate. Others are waldraap ibis, palm cockatoo, bog turtle, drill, wild sheep, and greater hornbill. This last species is now being studied for subspecies relatedness through DNA recovered from molted feathers, alleviating the need to handle the birds themselves. In another development, the inheritance of paternally derived mitochondrial DNA has been documented by collaborators at NYZS, the University of California, and Upsalla University in Sweden. This adds a potentially powerful new tool in assessing population histories.

The Animal Identification Program, conducted by Susan Elbin and supported by the Institute for Museum Services, was completed during the year. Implanted micro-transponders now identify several hundred Bronx Zoo animals. As a member of the IUCN/CBSG Working Committee on Permanent



Scanning a nyala calf's micro-transponder for identification

Identification, Elbin has established implantation site recommendations for a variety of species. She continues to work on applying barcode technology to animal inventory and other data collection.

Animal Records staff arranged 260 transactions to and from zoological institutions throughout the world. Foreign transactions required the acquisition of 35 Federal permits from the United States departments of Agriculture and Interior. Computerized records are now maintained on 20,000 individual animals, past and present, with a location code for every animal in the Zoo being added last year. Zoo professionals and other scientists from China, Italy, Venezuela, Trinidad, Australia, and Indonesia received information and training on the use of our ISIS/ARKS computerized record system.

Seventeen staff members completed the basic Keeper Training Program. "Behavioral Research in Animal Management," a six-part series of lectures and workshops, was also offered as part of the program by Mammal Curator Fred Koontz, along with animal behaviorists from Cornell University, the University of Washington, and the International Crane Foundation.

A new database acquired by the library—*Wildlife and Fish Worldwide*—contains nearly 300,000 references to wildlife biology and conservation literature of the past 20 years. Updated twice a year, the new program eliminates the cost and complexity of accessing external databases. Other library projects include computerization of the card catalog and other indexes to NYZS historical records and publications, support for research on various subjects, and a continuing program of microfilming irreplaceable records.

Breeding for Conservation

Nearly 2,000 babies of 200 mammal, bird, amphibian, reptile, and fish species were born or hatched during the year in NYZS breeding programs. About 90 percent of the Bronx Zoo's acquisitions are through birth.



FOZ volunteer Denise McGill with three of Bronx Zoo's current baby gorillas.

SANCTUARIES FOR WILDLIFE

Animal Census (at Dec. 31, 1990)

Bronx Zoo

	Species and subspecies	Specimens owned	Births/Hatchings
Mammals			
Marsupialia—Kangaroos, phalangers, etc.	3	53	1
Insectivora—Hedgehogs	2	6	3
Chiroptera—Bats	9	594	355
Primates—Apes, monkeys, marmosets, etc.	28	225	59
Edentata—Armadillos, sloths, anteaters	2	2	0
Lagomorpha—Rabbits	1	3	0
Rodentia—Squirrels, mice, porcupines, etc.	40	406	293
Carnivora—Bears, raccoons, cats, dogs, etc.	23	125	12
Pinnipedia—Sea lions, etc.	1	9	1
Proboscidea—Elephants	2	8	0
Hyracoida—Hyraxes	1	12	3
Perissodactyla—Horses, rhinoceroses, etc.	6	70	6
Artiodactyla—Cattle, sheep, antelope, etc.	29	557	181
Totals	147	2,070	914
Birds			
Struthioniformes—Ostriches	1	2	0
Rheiformes—Rheas	1	5	0
Casuariiformes—Cassowaries, emu	2	3	0
Tinamiformes—Tinamous	1	3	0
Sphenisciformes—Penguins	2	10	0
Pelicaniformes—Pelicans, cormorants	3	21	0
Ciconiiformes—Heron, storks, flamingos, etc.	12	121	18
Anseriformes—Swans, ducks, geese, screamers	46	225	14
Falconiformes—Vultures, hawks, eagles	6	14	0
Galliformes—Quail, pheasant, etc.	26	94	16
Gruiiformes—Hemipodes, cranes, rails, etc.	18	77	20
Charadriiformes—Plovers, gulls, etc.	21	108	9
Columbiformes—Pigeons, doves	10	20	1
Psittaciformes—Parrots, etc.	14	25	0
Cuculiformes—Touracos	5	10	0
Strigiformes—Owls	7	10	1
Caprimulgiformes—Frogmouths	1	3	0
Coliiformes—Mousebirds	1	2	0
Coraciiformes—Kingfishers, hornbills, etc.	17	36	5
Piciformes—Barbets, toucans, woodpeckers	3	3	0
Passeriformes—Perching birds	95	251	24
Totals	292	1,043	108
Amphibians and Reptiles			
Caudata—Salamanders	4	6	0
Anura—Frogs, toads	19	64	0
Chelonia—Turtles	49	420	53
Crocodylia—Alligators, caimans, crocodiles	13	223	33
Squamata (Sauria)—Lizards	23	88	1
Squamata (Serpentes)—Snakes	60	238	25
Totals	168	1,039	112
Bronx Zoo Census	607	4,152	1,134

N.B. The Bronx Zoo census includes 1,859 animals of 231 endangered, threatened, or vulnerable species. 588 animals were on loan to 101 other wildlife collections, and 297 animals were on loan from 70 wildlife collections.

Children's Zoo, Bronx Zoo

	Species and subspecies	Specimens owned	Births/Hatchings
Mammals			
Insectivora—Hedgehogs	3	6	1
Edentata—Armadillos	3	2	0
Pholidota—Pangolins	1	1	0
Lagomorpha—Rabbits	1	12	0
Rodentia—Mice, porcupines, etc.	6	27	0
Carnivora—Foxes, ferrets	6	21	0
Perissodactyla—Horses	2	4	0
Artiodactyla—Goats, sheep, camels, etc.	6	37	6
Totals	28	110	7
Birds			
Ciconiiformes—Hérons	2	18	3
Anseriformes—Ducks, geese	9	71	15
Falconiformes—Falcons	2	4	0
Galliformes—Chickens	3	75	39
Columbiformes—Doves	2	3	0
Psittaciformes—Parrots	10	11	0
Strigiformes—Owls	3	4	0
Caprimulgiformes—Frogmouths	1	1	0
Piciformes—Toucans	1	1	0
Passeriformes—Perching birds	1	1	0
Totals	35	188	57
Amphibians and Reptiles			
Caudata—Salamanders	1	2	0
Anura—Frogs, toads	1	6	0
Chelonía—Turtles	6	42	0
Crocodylia—Alligators	1	4	0
Squamata (Sauria)—Lizards	6	12	0
Squamata (Serpentes)—Snakes	8	22	0
Totals	21	80	0
Children's Zoo Census	84	378	64

N.B. The Children's Zoo census includes 82 animals of 35 endangered, threatened, or vulnerable species. 4 animals were on loan to 3 other wildlife collections, and 12 were on loan from 6 other wildlife collections.

SANCTUARIES FOR WILDLIFE

Wildlife Survival Center, St. Catherines Island, Georgia

	Species and subspecies	Specimens owned	Births/Hatchings
Mammals			
Marsupialia—Wallabies	1	23	4
Primates—Lemurs, macaques	4	52	6
Perissodactyla—Zebras	1	6	3
Artiodactyla—Antelope	6	79	16
Totals	12	160	29
Birds			
Ciconiiformes—Storks	3	18	0
Anseriformes—Geese	1	2	0
Galliformes—Pheasants	6	23	8
Gruiformes—Cranes, bustards	10	71	0
Columbiformes—Pigeons	1	1	0
Psittaciformes—Parrots	10	41	10
Coraciiformes—Hornbills	5	14	0
Totals	36	170	18
Reptiles			
Chelonina—Turtles	2	99	35
Wildlife Survival Center Census	50	429	82

N.B. The WSC census includes 357 animals of 39 endangered, threatened, or vulnerable species. 120 animals were on loan to 42 other wildlife collections, and 74 were on loan from 29 other wildlife collections.

Central Park Zoo

	Species and subspecies	Specimens owned	Births/Hatchings
Mammals			
Insectivora—Tree shrews	1	1	0
Chiroptera—Bats	1	11	0
Primates—Monkeys	4	31	11
Rodentia—Accouchis, squirrels	2	3	0
Carnivora—Bears, otters, pandas	4	10	0
Pinnipedia—Seals, sea lions	2	7	1
Totals	14	63	12
Birds			
Sphenisciformes—Penguins	2	32	1
Anseriformes—Swans, ducks	5	18	6
Galliformes—Partridges	1	4	0
Charadriiformes—Puffins	1	36	1
Columbiformes—Doves	3	5	1
Psittaciformes—Parrots	1	8	0
Cuculiformes—Turacos	1	2	0
Strigiformes—Owls	1	1	0
Piciformes—Toucans	1	2	0
Passeriformes—Perching birds	29	105	75
Totals	45	213	84
Amphibians and Reptiles			
Anura—Toads and frogs	18	315	50
Chelonina—Turtles	13	75	0

SANCTUARIES FOR WILDLIFE

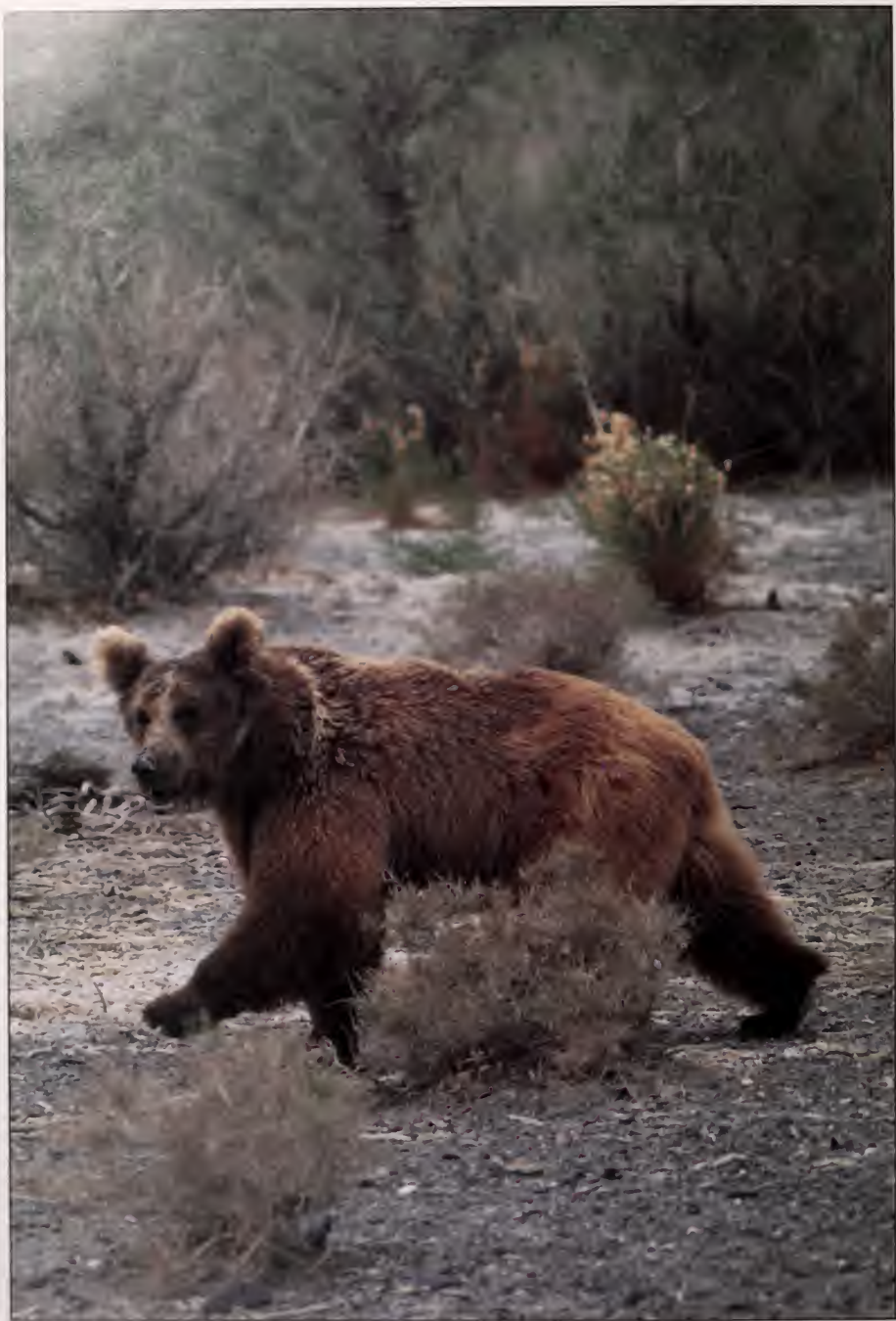
Central Park Zoo

	Species and subspecies	Specimens owned	Births/Hatchings
Amphibians and Reptiles (Cont'd)			
Crocodylia—Caiman, alligators	1	2	0
Squamata Sauria—Lizards	16	95	16
Squamata Serpentes—Snakes	7	48	33
Totals	55	535	99
<hr/>			
Central Park Zoo Census	114	811	195

N.B. The Central Park Zoo census includes 104 animals of 19 endangered, threatened, or vulnerable species.

New York Aquarium

Phylum	Class	Order	Species	Specimens
Chordata	Chondrichthyes— Cartilaginous fishes: Sharks, rays, chimeras	Heterodontiformes—Horn sharks	1	2
		Squaliformes—Typical sharks: Sand tigers, lemons	6	19
		Rajiformes—Rays, skates	3	10
	Osteichthyes— Bony fishes	Lepidosireniformes—Lungfishes	2	4
		Semionotiformes—Garfish	1	6
		Elopiformes—Tarpon, bonefish	1	4
		Anguilliformes—Eels, morays	6	12
		Osteoglossiformes—Arawana, arapaima, knife-fish	3	8
		Salmoniformes—Trouts	2	26
		Cypriniformes—Minnows, carp, cavefish, piranha, tetra	7	420
		Batrachoidiformes—Toadfishes	3	42
		Atheriniformes—Platys, swordtails, killifish, silversides, needlefish, flyingfish, guppies	5	230
		Beryciformes—Squirrelfishes, flashlight fish	5	12
		Gasterosteiformes—Seahorses, pipefish	3	30
		Perciformes—Perches, sea basses, porgies, cichlids, tangs, clownfish, etc.	144	1,382
		Pleuronectiformes—Flatfishes	4	12
		Tetraodontiformes—Puffers, boxfish, triggerfish	10	25
	Reptilia	Chelonia—Sea turtles	2	10
	Aves	Sphenisciformes—Penguins	1	39
	Mammalia	Pinnipedia—Seals, sea lions, walrus	5	18
		Cetacea—Whales, dolphins	2	8
Cnidaria	Anthozoa—Corals, anemones		35	numerous
Annelida	Polychaeta—Marine worms		10	500
Arthropoda	Crustacea—Lobsters, shrimps, crabs, isopods, etc.		8	100
		Arachnida—Horseshoe crab	1	10
Mollusca	Gastropoda—Snails		3	60
	Cephalopoda—Octopus, nautilus, cuttlefish		5	30
Echino- dermata	Asteroidea—Starfish		5	49
	Echinoidea—Sea urchins		3	25
Totals			286	3,093+



Gobi brown bear in Mongolia.

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WILDLIFE CONSERVATION INTERNATIONAL

The Society's global field program gathers the data necessary to devise long-term conservation strategies, establishes and helps maintain parks and reserves, and trains local scientists to work in their own countries. Reports on 132 conservation projects conducted by WCI biologists in 38 nations around the world.

The year was characterized by new and expanded regional projects, geared to the interdependence of natural systems and the need for cooperation across and within national borders. Paseo Pantera, for example, links conservation areas throughout Central America. Included are projects that will create land corridors between protected areas and others that aim to develop economic incentives on behalf of conservation. A major effort in Ecuador combines wildlands protection with rural development. In Venezuela, WCI is working with the government and local organizations to develop new management solutions for the national park system. And in Brazil the Mamirauá project will protect and manage the largest tract of flooded forest in Amazonia.

African and Asian programs are also expanding in scope. A major effort in Congo is helping to establish procedures for the national park system and, more specifically, to develop a management plan for the Nouabalé-Ndoki Reserve. The Program Outside Parks in Kenya integrates the human use of natural resources with preserving the unique savanna systems. In both Indonesian and Malaysian Borneo, WCI scientists are striving to understand how different land-use patterns in tropical forests—everything from selective logging to slash-and-burn agriculture—affect the wildlife landscape.

Accompanying the growth in project scope and numbers is a need for greater regional coordination.

Regional meetings during the year in Ecuador, Thailand, Cameroon, and Kenya allowed WCI staff to carefully consider conservation needs and solutions on a more integrated basis. The larger size of some projects has also resulted in a sharper focus on project management. Stretched to its administrative limit, headquarters staff in New York had to increase. Bureaucracy had to be tightened up, proposals and reports had to be written. For an organization run by field scientists, people with little interest in paper-pushing, these developments were difficult. But lines of communication are now firmly established, and WCI functions more than ever as a program determined by the needs of conservation in the field.

East African Savannas

Since wild animals do not necessarily stay within their protected areas, several special programs are underway to help safeguard wildlife outside parks and in corridors between them. Generally, this requires the cooperation of local landowners and their participation in land-use decisions.

Around Kenya's Amboseli National Park, East Africa Regional Coordinator and Senior Conservationist David Western has been working with local people and agencies to keep wildlife migratory areas open and unfenced. Prompted in part by an increasing awareness of the economic value of wildlife, ranchers have passed a resolution to keep a large area bordering

the park open to both communal livestock and wildlife. Economic incentives are also being used in the Turkana area of northern Kenya, where WCI is helping safari operators obtain wildlife viewing rights from local landowners.

Seasonal wildlife migration routes are the issue as well in the Athi-Kapiti plains south of Nairobi National Park. Following an Environmental Impact Statement by Western and Helen Gichohi, an adjunct area will be declared to the southwest of the park next to a proposed Export Processing Zone, or commercial area, to the southeast. Gichohi will head WCI's new project to help plan and manage both areas.

Impact studies continued inside and outside parks in Kenya. John Waitthaka examined the role of elephants in improving habitat for livestock. Evans Mwangi evaluated the ecology of Nakuru National Park, which is now completely fenced and subject to isolation. Lucy Muthee and Wesley Henry investigated the impact of tourists on wildlife in the Masai Mara and will help develop a plan to improve tourist use and encourage revenue-sharing with local populations.

In Tanzania, surveys of wildlife migration routes are being conducted by Research Zoologist Patricia Moehlman and personnel from the Ngorongoro Conservation Area, Lake Manyara National Park, and Tarangire National Park in order, ultimately, to establish safe migration corridors between the parks.

For the past 20 years the Savanna Program has emphasized cooperation with local agencies in training nationals at all levels of conservation activity. WCI now works closely with the Kenyan Wildlife Service (KWS), the Tanzanian National Parks Service (TANAPA), the Ethiopian Wildlife Conservation Organization (EWCO), and with officials at parks throughout the region. The emphasis has been particularly on providing skills needed to manage and monitor wildlife parks and reserves.

WCI's all-Kenyan staff is now spawning a new generation of Kenyans in conservation. In March 1991, for example, Chris Gakahu organized a workshop on tourism management in the Masai Mara that was co-hosted by WCI and the Narok County Council. WCI staff presented background information and proposals on improving tourism planning to attendees with local, national, and international interests.

Tanzanian monitoring crews trained in WCI



Forest elephants and bongo at a Central African mineral lick.

programs are now collecting data on wildlife, vegetation, climate, and human influences in four parks and reserves. The oldest of these programs, in the Ngorongoro Conservation Area, has added elephant surveys to its activities, and WCI's Moehlman is involved in a new project funded by the National Science Foundation to investigate human, livestock, and wildlife ecology in the area.

Rebuilding programs and facilities has already begun in Ethiopia after a period of unrest during the government changeover. WCI activities had been suspended for a while, and Associate Research Zoologist Chris Hillman, who is advisor to EWCO, reported that facilities in several national parks were destroyed or damaged.

Bale Mountains National Park was particularly hard hit, with the looting of the WCI research station, the burning of three outposts, and the poaching of mountain nyala. But Claudio Sillero-Zubiri and Maria Gotelli, research fellows with the Simien Jackal Conservation and Ecology Project, have already resumed their work in the park.

Cathy Schloeder and Michael Jacobs have also returned to Awash National Park, which suffered little damage. They are obtaining data for managing wildlife and integrating the concerns of local people in the park's management.

African elephant and rhino programs have produced some promising results. David Western recently ended his three-year term as chairman of the African Elephant and Rhino Specialist Group. During his term he helped persuade the Convention on International Trade in Endangered Species (CITES) to designate the African elephant an endangered species, thus

banning all trade in ivory. Western and Chris Gakahu have been involved in highly successful efforts to breed black rhinos in well-guarded Kenyan sanctuaries. Rhino populations are growing at Aberdares, Lake Nakuru, and Nairobi national parks. Nairobi now has more than 60 and is providing rhinos to start breeding programs in other parks.

Projects in two new countries were added. In Botswana, Peter Frederick conducted a survey of the Okavango Delta and proposed an improved plan for its management. In Namibia, Joel Berger is assessing the impact of removing rhinos' horns before poachers get to them.

African Forests

With funding from WCI, USAID, and the World Bank, the Congo Forest Conservation Project will establish a protected reserve in the biologically rich Nouabalé-Ndoki area of northwestern Congo. Under the direction of Michael Fay, working with the Congo government, this major initiative will compile an extensive inventory of the forest and prepare sustainable use plans for the areas surrounding the core forest reserve. Included will be research on the forest elephant. Exploration of the region by Fay and Marcellin

Agnagna of the Congolese Ministère de l'Economie Forestière in 1990 resulted in the current plan. During this trip, potential reserve boundaries were defined and densities of forest elephants, lowland gorillas, and chimpanzees were estimated and found to be very high. The government declared its intention to create a national park later that year. WCI project staff will base two field stations in the forest and administrative headquarters, managed by Matthew Hatchwell, in the Congo capital of Brazzaville.

A new training and monitoring center, funded by USAID, is being built in Zaire's Ituri Forest, in the town of Epulu. Under John and Terese Hart, the center will provide students and professors from the University of Kisangani with a base for exploring and documenting the forest's biological diversity. Meanwhile the Harts continue to expand their work on okapi and duiker ecology and on rain-forest dynamics.

In eastern Zaire, Jefferson Hall began a three-month appraisal of the endemic Grauer's gorilla, last surveyed in 1959 by George Schaller, who estimated its population between 5,000 and 15,000. Preliminary findings suggest an uneven distribution of gorillas. Hunting has reduced gorilla densities to low levels in most of the region, though pockets of significant populations remain.

In Cameroon's Korup Forest National Park, James Powell and his colleagues conducted many surveys during the year and hosted a regional conference for WCI's African Forest personnel in January 1991. Ann Edwards and John Payne completed surveys of primates and duikers; reptile, bat, and bird surveys



Flooded forest of the Amazon.

Knowing how an ecosystem works, knowing the interrelations between that system and its human inhabitants, is critical to effective conservation. In WCI, we make it our business to get that knowledge, and we are thus uniquely capable of generating innovative solutions to problems and developing realistic conservation programs.

John G. Robinson
Director, Wildlife Conservation International



Scientists in WCI's African Forests program met in Korup Forest National Park, Cameroon.

continued; and small mammal surveys and general inventory work got under way. Experts in biotelemetry from the Bronx Zoo are helping to develop techniques for radio-collaring forest elephants.

Hunting still has a significant impact on wildlife densities in the forest, especially on large mammals and birds. It remains the greatest obstacle to wildlife recovery in Korup. Project personnel have had some success in providing alternative sources of income and in discouraging hunting in the core study area, but roughly 600 inhabitants in six villages remaining in the forest still depend on bushmeat as a source of protein and income. Relocation of the villages to new sites in the buffer zone is being encouraged, and the government of Cameroon, the Worldwide Fund for Nature-UK, and the British Overseas Development Agency will help with the move by providing buildings and logistical support.

A little-known area of southeastern Cameroon was explored by Karl Stromayer and Atanga Ekobo to assess its conservation potential and to determine possible boundaries for a series of reserves. Proposals for the Lake Lobeke, Mongokele, and Boumba Bek reserve areas emphasized gorillas and elephants. This region of great biodiversity contains some of the highest densities of gorillas, elephants, and bongo in Africa.

Expansion of the Kibale Forest Project in Uganda, where WCI has been operating since 1970,

will include emphasis on applied aspects of forest management and on the training of Ugandan nationals. WCI Assistant Director for African Programs William Weber is working with Kibale Forest Project directors Andrew Johns and Gilbert Basuta, as well as representatives of USAID and Makerere University on these new aspects of the program. Ongoing projects in the forest include Basuta's research on the ecology and behavior of chimpanzees, John Kasenene's study of the ecology and use of wild coffee, and Marijke Steenbeek's outreach program.

Aspects of the Nyungwe Forest Conservation Project in Rwanda, particularly those concerning tourism, were hampered by an invasion of the area in October 1990 by Rwandan refugees living in southern Uganda. Attention was thus concentrated on inventory work, which is currently a high priority, led by Elizabeth Williamson. By comparing data from surveys in different zones of the forest, the project's staff will form a comprehensive picture of species diversity and distribution, enabling them to evaluate and implement the current management plan for the area. Training personnel in French and English, the reception of visitors, and forest ecology has also expanded. WCI Biodiversity Coordinator Amy Vedder visited Rwanda in June 1991 to help evaluate the project's inventory methods and goals as it enters its third year.

Central America and the Caribbean

News from the region was dominated by the launching of Paseo Pantera ("Path of the Panther"), a multinational effort that will link park-related conservation projects in Belize, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama. Funded by a major matching grant from USAID, and in close collaboration with the Caribbean Conservation Corporation (CCC), the program will stress regional conservation strategies and cross-border agreements for such diverse ecosystems as rain forests, cloud forests, mangrove swamps, coastal areas, and coral reefs.

As developed by Regional Coordinator Archie Carr III and managed by James Barborak, Paseo Pantera will include regional ecotourism and buffer zone projects as well as environmental education and management planning. The Global Life of Project Plan and the Two-Year Plan were submitted to the regional office of USAID in March 1991, and several new projects were launched in the ensuing months.

Ecotourism as a conservation tool in Central America will be explored in three phases beginning with the production of a handbook to be used by committees in each country. The first of three buffer-zone projects will involve the Bay Islands off the Caribbean coast of Honduras. Environmental education programs have also been started there under Susan Jacobson, and at the Rio Platano Biosphere Reserve in Honduras under Vince Murphy.

Scientific, management planning projects under Paseo Pantera include a new study by Julieta Carrion de Samudio of wildlife use by native peoples in Bocas del Toro National Park and of the conservation needs of El Cope National Park, both in Panama. While other new efforts are considered in El Salvador, Honduras, Nicaragua, and Costa Rica, several ongoing projects have been incorporated into the Pantera network.

In Belize, Jacque Carter's and Janet Gibson's work on management plans for Glovers Reef was given a boost by a major USAID grant in March toward establishing reserve status. World Heritage Site or Biosphere Reserve status is still being sought for the entire Barrier Reef. Protected status is also proposed for the Maya Mountains in Belize, where Bruce Miller is collecting information on migratory birds in the Caracol and Gallon Jug areas. Around Tikal in the Maya

Biosphere Reserve of El Petén, Guatemala, Howard Quigley, Milton Cabrera, and Maria José Gonzalez began their census of mammal populations.

Outside the Pantera sphere, fieldwork on several important projects in Mexico was concluded or winding down, including Eduardo Iñigo's work on birds of prey in the Lacondona Forest, Ignacio March's study of white-lipped peccaries around Calakmul, and Fernando Gonzalez-García's investigation of the horned guan in Chiapas.

Tropical South America

WCI scientists are scattered throughout the forests of northern South America. The program in Venezuela now includes projects ranging from hunter education to a study of spider monkey ecology. In a recently signed cooperative agreement involving the National



White uakari in Brazil's flooded forest.

Parks Institute (INPARQUES) and Econatura, WCI will provide training and support for young scientists and park personnel under the direction of long-time WCI Research Fellow Edgard Yarena. With major funding from the European Economic Community, biological monitoring, field research, and training will be developed in order to establish a sound scientific foundation for improving the parks system.

Working in the central plains of the country with Venezuelan colleagues and students, John Thorbjarnarson has developed a research and conservation program for endangered Orinoco crocodiles in two national parks and several private reserves. Support is provided by the Venezuelan Ministry of the Environment and FUDENA, a national conservation organization, as well as WCI.

Some Wild Census Figures—The Battle to Save Wildlife

Counting animals in the wild is often a necessary part of conservation. Censuses reveal whether particular species, or entire ecosystems, are declining, maintaining their equilibrium, or, more rarely, recovering. WCI scientists devote a great deal of time to this arduous task, and some interesting and informative figures have emerged from their work in the past two years.



Wild Bactrian camel and wild ass, Mongolia.

- At Fanjing Mountain in China's Guizhou Province, the population of golden monkeys is estimated at less than 1,000 by William Bleisch. He has counted as many as 428 in one group and 50 in another.
- Alan Rabinowitz puts the number of Indochinese tigers in Thailand's forests at far less than the 400-600 reckoned as late as 1990.
- George Schaller reports the population of Bactrian camels in the Gobi Desert of Mongolia and China at about 1,000, according to local biologists.
- In Sumatra's Gunung Leuser National Park, Carel van Schaik calculates that two-thirds of the forest's vertebrate biomass, dominated by primates, lives in the trees. Mammals outweigh birds by a factor of 20.
- From 590 to 998 Humboldt's penguins, depending on the season, have been counted by Chile's Forestry Service on Pan de Azúcar Island, now the species' major breeding ground in Chile.
- Claudio Campagna judges that 43,000 elephant seals live at Peninsula Valdés in Patagonia, Argentina, making it the only growing colony in a generally declining population.
- The latest census of mountain gorillas in the Virunga Mountains of Rwanda, where the first study was conducted by WCI's George Schaller in 1959, counted about 322 animals, up from a low of 254 in 1981.
- In the general census of forest elephants being directed by Richard Barnes in Equatorial and West Africa, by far the greatest density of animals—six per sq. km.—was found by Karl Stromayer and Atanga Ekobo in Cameroon's Lake Lobeke area.

Colombia's forests, in the area surrounding Utria National Park, are being studied by a multi-disciplinary team of scientists, including WCI's Heidi Rubio. She hopes to resolve ecological conflicts arising from the use of wildlife by the Enbara Indians in this unusually species-rich region. Also in the cloud forest, a landmark radio-tracking and ecological study was being conducted by Craig Downer of the little-known mountain tapir, the largest mammal in this ecosystem.

Two major projects are underway in Ecuador. Luis Suárez and Patricio Mena are gathering data in a three-year project that will lead to long-term biological monitoring of "indicator species" in the high cloud forests. In the USAID-funded Sustainable Use of Biological Resources (SUBIR) program, WCI is collaborating with CARE International and The Nature Conservancy. With the participation of Suárez and Lisa Naughton, the project began to investigate the possibility of preserving Ecuador's extraordinary biodiversity by using the forests on a sustainable basis and involving local people in conservation.

In the first major state and federal reserves established to protect Brazil's threatened flooded forests, Research Zoologist Márcio Ayres is building an important multi-disciplinary program with Brazilian and international scientists. The Lake Mamirauá Ecological Station has become the center for studying and preserving this vast area and for training young professionals in its ecology and practical management.

On the 127,000-acre ranch of Roberto Klabin in the Pantanal region of southern Brazil, Charles Munn, assisted by Katherine Renton, began studies of the great hyacinth macaw, now reduced to about 3,000 in nature and severely threatened by the international bird trade. Munn continues to monitor the status of macaws and other wildlife in Peru's Manu National Park and the recently established Tambopata-Candamo Reserve. In the same area Enrique Ortiz began a three-year study of the impact of human use on the ecology of the Brazil nut tree, one of the most important and least understood food sources in the Amazon basin.

Support for young indigenous scientists, in the form of research grants and training in conservation biology, remains particularly active in tropical South America. Shortcourses were conducted during the year in Venezuela, Ecuador, and Colombia, and

the training program was formalized under the direction of Assistant Director for Latin American Programs Stuart Strahl in New York, Márcio Ayres in Brazil, and Regional Training Coordinator Maria Elfi Chaves in Colombia. In the critical Andean-Amazon region, a training network is being formed with the collaboration of Econatura in Venezuela, Fundación Natura in Colombia, EcoCiencia in Ecuador, and APECO in Peru. The program will sponsor student project grants and regular training sessions.

Temperate South America

Through the efforts of long-time WCI Research Fellow Patricia Majluf, a proposal to allow the hunting of sea lions and fur seals was turned down by the Peruvian Ministry of Fisheries. Her report and widespread coverage in the media were instrumental in reasserting the "vulnerable" status of these species and their protection from hunting, capture, and trade.

Another dramatic success, based on the work of Mario Parada, was scored in Chile, where the government set aside 280 square miles of critical flamingo breeding habitat in five major reserves in the high Andean plains of the north. The task now is to gather migration and nesting information on flamingos and to protect their altiplano habitat on a regional basis in Bolivia, Argentina, and Peru, as well as Chile. This work has already been started by Enrique Bucher and Terence Boyle in northwestern Argentina, with the international database coordinated by CONAF, the Chilean forestry service.

Andrew Taber, who began the long-term study of the Chacoan peccary in Paraguay, has moved his center of operations to Bolivia, where he will also be working on peccary management plans for several reserves in the eastern part of the country. Based in Santa Cruz, he has local support from the Fundación Amigos de la Naturaleza. Taber's work on the Chacoan peccary is being carried on by Nora Neris de Colman.

Surveillance and management of Argentina's Patagonia coast continues to expand under the guidance of Regional Coordinator and Senior Conservationist William Conway. A complete aerial census of seabirds and marine mammals along more than 750 miles of coast in Chubut and Santa Cruz provinces was conducted, and the second year of the Punta Leon colony inventory was completed by Claudio

Campagna, Pablo Yorio, and Guillermo Harris. Most important has been the development of the WCI sponsored Patagonian conservation organization, Fundación Patagonia Natural, under the leadership of Harris. With Campagna, Harris played a major role in defeating an effort to reopen sealing in Argentina. FPN leads the battles to win protection for the great bird and mammal colonies at Punta Leon. Campagna has extended his long-term study of sea lions to include its main predator, the killer whale. At Punta Tombo, where Dee Boersma has been conducting conservation research on Magellanic penguins over the past ten years, reconstruction of the station's facilities were 70 percent complete and many local students were added to the training program.

Tropical Asia

With the visit of WCI Director John Robinson and Assistant Director for Asia Mary Pearl to Eastern Malaysia in July and August 1990, attention was focused on intensifying the comprehensive conservation program for Malaysia's two provinces on Borneo, Sarawak and Sabah. Associate Research Zoologist Elizabeth Bennett, in residence there for several years, began directing an assessment of the impact of logging, hunting, mineral levels, shifting cultivation, and bot-

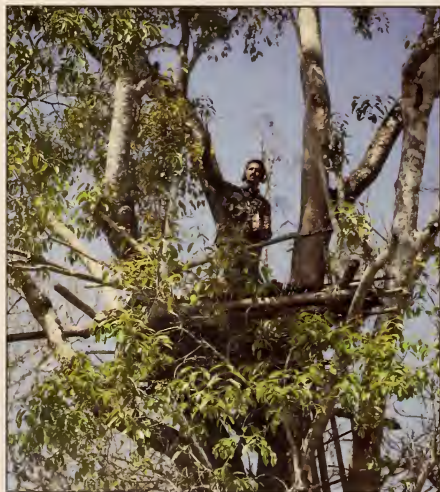
any on wildlife numbers in Sarawak, in cooperation with the Forest Department. She is also conducting, with Ramesh Boonratana, a survey of the entire Kinabatangan area of eastern Sabah, which has important populations of orangutans, elephants, Sumatran rhinos, and, especially, proboscis monkeys, which Boonratana continues to study. A two-year study throughout Sarawak and Sabah to determine the abundance and distribution of large vertebrates will help shape the regulation of game hunting, and a comprehensive survey in the Batang Ai/Lanjak Entimau region of Sarawak will determine the effects of both hunting and slash-and-burn farming.

At the request of Mahedi Andau, director of the Wildlife Department of Sabah, WCI Research Zoologist Alan Rabinowitz began to advise the department on restructuring toward a greater emphasis on conservation. He will set up a research program in the fall of 1991 and has planned regional training courses for wildlife managers with Elizabeth Bennett.

In Thailand during the year, Rabinowitz completed his research on carnivores at Huai Kha Khaeng National Park and surveyed tiger populations along the northern border, with the hope of protecting them. Protecting Thailand's parks and reserves is the new focus of WCI's grant funds administered by Professor Warren Brockelman of Mahidol University in Bangkok. Researchers from the universities and the Forest Department have been invited to take part in this broad survey, the results of which will be reviewed at Mahidol and by the government for possible conservation action.

Rabinowitz also turned up in Laos in November 1990, with Sompoad Srikosamatara, to discuss conservation priorities for the first time with government officials. Srikosamatara later signed an agreement between WCI and the government concerning systematic wildlife surveys and training for wildlife management personnel. In his native Thailand, Srikosamatara continues his long-term study of hoofed-animal distribution in relation to the location of key minerals in their diet.

The stress in Indonesia was on training. At Gunung Leuser National Park in northern Sumatra, Carel van Schaik taught Indonesian forest ecologists how to census wildlife and to evaluate the impact of human use of the forest. Similar lessons were taught



Ullas Karanth tracking tigers at Nagarhole National Park, India.

by Lisa Curran in Indonesian West Kalimantan, Borneo, particularly with regard to logging and seed collection.

WCI has been at the center of conservation research and action in Papua New Guinea for nearly ten years, a major supporter of the indigenous Research and Conservation Foundation of Papua New Guinea, the organizer of a consortium of American conservation organizations, and the principal sponsor of research in the country. The research program will now move ahead under the direction of Associate Research Zoologist Bruce Beehler, an internationally recognized authority on New Guinea wildlife. With several projects already underway at Crater Mountain Wildlife Management Area, WCI is working to create a model conservation and rural development program that will include studies of the effects of tourism on local people and wildlife, and intensive efforts to improve local people's lives through garden intensification, cooperative manufacturing, and marketing of artifacts and carefully selected nontimber forest products.

Temperate Asia

WCI Director for Science George Schaller worked in both Mongolia and China during the year. With local scientists in Mongolia he surveyed Gobi brown bears and snow leopards, and he began his own research on wild camels of the Gobi Desert, with the goal of eventual reserve designation. In China, he was concerned with the distribution and abundance of large mammals, including Tibetan antelope, wild yak, and wild ass in the Chang Tang Plateau. The Chinese government officially designated 92,000 square miles of the plateau as one of the world's largest protected areas.

Research on the golden langur of Guizhou Province in southern China was begun by WCI's William Bleisch, Xie Jiahua of Guiyang Normal University, and Yang Yeqing, director of the Fanjingshan Reserve. Useful new information has emerged about this formerly unknown animal, and the groundwork for managing the reserve and its unique flora and fauna has been established.



WCI's field site at Middle Caye, Glovers Reef, Belize.

New Parks and Reserves Around the World

WCI studies and recommendations were instrumental in the declaration or consideration of the following wildlife parks, reserves, and centers during the year.

Chang Tang Reserve, Tibetan Plateau, China.

92,000 square miles—one of the world's largest reserves—wild yak, tibetan antelope, snow leopards, Tibetan bears, lynxes, wild asses—surveyed by WCI Director for Science George Schaller.

National Flamingo Reserve System, Chile.

280 square miles—high in the Andean altiplano—nesting range for three species of flamingo—administered by the Chilean Forestry Service in five areas.

Training and Monitoring Center, Epulu, Ituri Forest, Zaire.

New headquarters for studying the forest's biodiversity, under WCI Research Zoologists Terese and John Hart.

Athi-Kapiti Plains, Kenya (in progress).

Area southwest of Nairobi National Park for wildlife migration—being planned by Helen Gichohi.

Nouabalé-Ndoke Reserve, Congo (in progress).

4,000 square miles—forest elephants, chimpanzees, gorillas, buffalo, leopards, giant hogs—largely untouched area—to be directed by Michael Fay, managed by Matthew Hatchwell.

Glovers Reef, Belize (in progress).

Part of the the Belize Barrier Reef, largest in the Caribbean—essential to the country's overall conservation and development—planning by Jacques Carter and Janet Gibson.

Wildlife Conservation International (WCI) Projects

Central America and the Caribbean

1. USAID/ROCAP-WCI/CCC cooperative program, Archie Carr III, James Barborak, and Kathleen Williams.
2. Belize Barrier Reef conservation and management, Belize. Jacque Carter and Janet Gibson.
3. Tropical forest reserve planning in Caracol, Belize. Bruce Miller.
4. Tarpon status and marine conservation, Costa Rica. Didihiier Chacon and Archie Carr III.
5. Park corridor planning, Costa Rica. Robert Carlson.
6. Population size and structure of Morelet's crocodiles in El Petén, Guatemala. Oscar Lara.
7. Survey of conservation needs in El Petén, Guatemala. Howard Quigley, Milton Cabrera, and Maria-José González.
8. Environmental education, Bay Islands, Honduras. Susan Jacobson.
9. Environmental education, Rio Platano Biosphere Reserve, Honduras. Vince Murphy.
10. Lacondona Forest Conservation, Mexico. Eduardo Iñigo and Rodrigo Medellín.
11. Calakmul Biosphere Reserve, Yucatan, Mexico. Joann Andrews.
12. Ecology of the horned guan, Chiapas, Mexico. Fernando Gonzalez-García.
13. White-lipped peccary study and habitat evaluation, Calakmul, Mexico. Ignacio J. March.



Field course in Brazil.

Training in the Field

Every regional WCI initiative involves training in conservation biology, in field study methods and ecological monitoring, environmental law and education. Programs ranging from intensive shortcourses in Venezuela, Ecuador, Colombia, and Peru to projects sponsored by Mahidol University in Thailand are training a new generation of scientists and other conservation professionals to work in their own countries. They are also providing a much-needed scientific foundation for conservation efforts.

In the past year, 420 people received WCI training in Asia, Africa, and Latin America. There were active programs in China, Indonesia, Malaysia, Mongolia, Papua New Guinea, Thailand, Cameroon, Ethiopia, Kenya, Rwanda, Sierra Leone, Tanzania, Uganda, Zaire, Argentina, Bolivia, Brazil, Colombia, Ecuador, Peru, and Venezuela.

14. Bastimentos Marine National Park management, ANCON, Panama.
15. Ecology and migration of marine turtles, Panama. Anne and Peter Meylan.
16. Wildlife use in Bocas del Toro and El Cope National Parks, Panama. Julieta Carrion de Samudia.

Tropical South America

17. IUCN Parrot Group support. Donald Bruning.
18. IUCN Cracidae Group support. Stuart Strahl.
19. Regional shortcourses in conservation biology. Stuart Strahl.
20. Hyacinth macaws, Brazil. Charles Munn.
21. Primates and flooded forest biogeography, western Amazon, Brazil. Márcio Ayres.
22. Biogeography, western Amazon, Brazil. Jay Malcolm.
23. Population estimate and ecological data, black-fronted piping guan, Brazil. Sandra Pacagnella.
24. White-lipped peccaries, Brazil. José Vagoso.
25. Alto Quindino avifauna conservation, Colombia. Luis Miguel Renjifo.
26. Indigenous communities, Utria National Park, Colombia. Heidi Rubio.
27. Mountain tapir, Ecuador. Craig Downer.
28. WCI/USAID cloud forest conservation, Ecuador. Luis Suárez and Patricio Mena.
29. Curassow surveys and hunter interviews, Ecuador. Ruth Garces.
30. Pinzon Island giant tortoise conservation, Galapagos Islands, Ecuador. Linda Cayot and Luis Calvopina.
31. Ecology of Amazon parrots and parks recommendations, Peru. Charles Munn.
32. Effects of hunting, Manu National Park, Peru. Carol Mitchell and Ernesto Raez-Luna.
33. Human use of the Brazil nut tree, Peru. Enrique Ortiz.
34. Orinoco crocodile conservation, Venezuela. John Thorbjarnarson.
35. Cracids, oilbirds, and wildlife trade, Venezuela. Stuart Strahl.
36. Rio Nícharé ethnobiology and rain-forest conservation, Venezuela. Isaac Goldstein and Stuart Strahl.
37. Timber exploitation, Imataca Reserve, Venezuela. José Ochoa.
38. Margarita Island Parrot Conservation, Venezuela. K. Silvius and P. Marquez.

39. Hunter education, Venezuela. José Lorenzo Silva.
40. Spider monkey ecology, Venezuela. H. Castellanos.
41. Henri Pittier National Park conservation program, Venezuela. Amigos Científicos del Parco Nacional Henri Pittier.
42. Private landowner conservation initiative, Venezuela. Gilberto Rios.
43. Parrot projects, Venezuela. Philip Desenne.
44. Venezuelan student conservation program, Venezuela. Econatura.
45. Freshwater turtles, Venezuela. Cynthia Lagueux.
46. Crocodiles, Venezuela. Andres Seijas.
47. Biocide use in the llanos, Venezuela. Gianfranco Basili and Stanley Temple.
48. Regional student grants programs, Venezuela, Colombia, Ecuador, and Peru. Stuart Strahl and Econatura.

Temperate South America

49. Sea lions and coastal management, Argentina. Claudio Campagna.
50. Support for the Department of Conservation, Chubut Province, Argentina. William Conway.
51. Conservation of Punta Leon seabird and mammal colonies, Argentina. Guillermo Harris, Claudio Campagna, and Pablo Yorio.
52. Oiled penguins, coastal conservation, Argentina. ECOBIOS.
53. Magellanic penguins at Punta Tombo, Argentina. P. Dee Boersma and Pablo Yorio.
54. Valdés Research Station, conservation coordination, Fundación Patagonia Natural, Argentina. Guillermo Harris.
55. Flamingo and seabird surveys, Argentina. Guillermo Harris.
56. Conservation of Patagonian cormorant colonies, Argentina. Gabriel Punta.
57. Flamingos, northwest Argentina. Enrique Bucher and Terence P. Boyle.
58. Peccaries and conservation management, Bolivia. Andrew Taber.
59. Curassows, parrots, and macaws, Bolivia. Guy Cox.
60. Flamingo Center, Chile. Mario Parada and CONAF.
61. Humboldt penguin conservation, Chile. Alfonso Glade, Mario Parada, and Hector Oyarzo.

62. Ecology and conservation of the Chacoan peccary, Paraguay. Andrew Taber.
63. South American fur seal ecology and conservation, Peru. Patricia Majluf.

East African Savannas

64. East African coordination and administration. David Western.
65. Rhino Rescue Fund. David Western.
66. African Elephant Action Plan. David Western.
67. Support for African Elephant and Rhino Specialist Group (IUCN). Christopher Gakahu.
68. Elephant genetics, "DNA fingerprinting." Nicholas Georgiadis.
69. Okavango Delta wildlife reconnaissance, Botswana. Peter Frederick.
70. Government Advisor in wildlife conservation, Ethiopia. Jesse C. Hillman.
71. Simien jackal ecology, Ethiopia. C. Sillero-Zubiri and M.D. Gottelli.
72. Conservation education, Ethiopia. John Osborne.
73. Awash National Park management, Ethiopia. Catherine Schloeder, Michael Jacobs, and Chris Hillman.
74. Zoological monitoring, Amboseli National Park, Kenya. David Western.
75. Nairobi National Park management, Kenya. Helen Gichohi and David Western.
76. Nakuru National Park management, Kenya. Chris Gakahu and Evans Mwangi.
77. Tourist impact on wildlife, Masai Mara, Kenya. Chris Gakahu and Wesley Henry.
78. Kirengela ecological design, Kenya. Helen Gichohi.
79. Laikipia Elephant Project, Kenya. John Waithaka.
80. Conservation of desert-dwelling black rhinos, Namibia. Joel Berger.
81. Somali wild ass conservation, Somalia. Patricia Moehlman.
82. Jackal ecology and Tanzanian conservation, Tanzania. Patricia Moehlman.
83. Ngorongoro Park monitoring and training, Tanzania. M. Mshanga.
84. Conservation status of forest birds in the Uzungwa Mountains, Tanzania. David Moyer.
85. Training and education, Tanzania. Patricia Moehlman.
86. Monitoring and training in Ruaha, Lake Manyara, and Tarangire National Parks, Tanzania. David Babu, Karim Hiri, and Patricia Moehlman.
87. Lake Manyara National Park expansion and monitoring, Tanzania. Patricia Moehlman.
88. Wild dog conservation, Zimbabwe. Joshua Ginsberg.

African Forests

89. Forest surveys—Regional networking and training, Congo, Gabon, Zaire. William Weber.
90. Forest elephant surveys and management plans, West Africa. Richard Barnes.
91. Primate use in forest habitats, West Africa. Cheryl Fimbel.
92. Status of elephants, Santchou Reserve, Cameroon. Martin Tchamba.
93. Black rhino status, Cameroon. Martin Tchamba.
94. WCI/USAID Korup Forest Project, Cameroon. James Powell.
95. Primate distribution and mammal abundance, Korup Forest, Cameroon. Ann Edwards and John Payne.
96. WCI/EC elephant surveys, Cameroon and Congo. Karl Stromayer and Atanga Ekobo.
97. Habitat disturbance analysis, Makokou Reserve, Gabon. Sally Lahm.
98. Impact of logging, Lope Reserve, Gabon. Lee White.
99. Manatees and coastal conservation, Ivory Coast. Kouadio Akoi.
100. WCI/USAID Nyungwe Forest conservation, Rwanda. Rob Clausen and Elizabeth Williamson.
101. Animal seed dispersers as key elements for conservation of tropical forests, Nyungwe Forest, Rwanda. Joseph Mvukiyeumwami, Amy Vedder, and Kanyoyo ka Kajondo.
102. Primate conservation and education, Tiwai Island, Sierra Leone. John Oates.
103. WCI/USAID Kibale Forest Station, Uganda. John Kasenene, Andrew Johns, and Makerere University.
104. Ecology and behavior of chimpanzees, Uganda. Gilbert Isabirye Basuta.
105. Potential economic importance of wild coffee, Uganda. John Kasenene.
106. Okapi ecology and behavior, parks planning, Ituri Forest, Zaire. Terese and John Hart.
107. Maiko National Park surveys, Zaire. Claude Sikubwabo.
108. Grauer's gorilla, Zaire. Jefferson Hall.

Temperate Asia

109. Wildlife surveys and reserve planning, Tibetan Plateau, China. George Schaller.
110. Guizhou golden monkey conservation and education, China. William Bleisch and Xie Jiahua.
111. Gibbon conservation, Yunnan, China. Chen Nan.
112. Wildlife research and conservation, Mongolia. George Schaller, A. Tulgat, and G. Amarsanaa.

Tropical Asia/Pacific

113. Regional training, Southeast Asia. Mary Pearl, Elizabeth Bennett, Alan Rabinowitz and Lisa Curran.
114. Tigers and other carnivores in Nagarhole National Park, India. Ullas Karanth.
115. Forest conservation policies, India. Balachander Ganesan.
116. Tropical ecology, Borneo, Indonesia. Tim O'Brien and Margaret Kinnaird.
117. Wildlife surveys and training, Laos. Sompoad Srikosamatara.
118. Wildlife surveys and logging impact, Sarawak, Malaysia. Elizabeth Bennett and Zainuddin Dahaban.
119. Proboscis monkey conservation, Malaysia. Ramesh Boonratana.
120. Langur conservation, Sabah, Malaysia. Arthur Mitchell.
121. Support for national conservation organization, Papua New Guinea. Mary Pearl, David Vosseler, and David Gillison.
122. Soil seed banks, Bulolo Valley, Papua New Guinea. Lawong Balun.
123. Dwarf cassowary conservation and reserve planning, Papua New Guinea. Andrew Mack and Debra Wright.
124. Carnivore ecology, Huai Kha Kaheng Sanctuary, Thailand. Alan Rabinowitz.
125. Conservation training and coordination, Thailand. Warren Brockelman and Alan Rabinowitz.
126. Research and training in conservation biology, Thailand. Sompoad Srikosamatara.



Professor Xie Jiahua, co-director of the Golden Monkey Project in south central China.

127. Ungulate distribution, Thailand. Sompoad Srikosamatara.
128. Tiger surveys, Thailand. Alan Rabinowitz.

North America

129. Humpback whale status and conservation, Hawaii, U.S.A. Deborah Glockner-Ferrari and Mark Ferrari.

Education and Training

130. Environmental education/"Outreach." James Connor.
131. Pew Charitable Trusts Field Training Grants. William Weber.
132. WCI Research Fellowship Program. Mary Pearl.



Pablo Python and Instructor Noreen Jeremiah lead a Bronx Zoo class.

ECOLOGICAL EDUCATION

Programs and publications that teach how nature works and raise public awareness about local and global conservation issues. Reports on innovative efforts in reviving science education, training teachers, using the zoos and aquarium as teaching resources, serving the schools of metropolitan New York, and reaching audiences here and abroad.

Bronx Zoo Education

Wildlife Inquiry through Zoo Education, the department's published curriculum in wildlife science and conservation, reached thousands of new junior high and high school students in 24 states during its third year of national dissemination. *Survival Strategies*, the second module of *W.I.Z.E.*, was adopted by 147 new schools, 58 percent of them public, 42 percent private.

The burgeoning network of *W.I.Z.E.* users has led to the development of a certified trainer program, which will be instituted in Iowa, Kansas, and Florida to increase the number of qualified *W.I.Z.E.* trainers for the new sites. Dissemination is also aided by *W.I.Z.E.* workshops hosted by cooperating zoological institutions, such as the Riverbanks Zoo in Colombia, South Carolina, and the Greater Baton Rouge Zoological Park in Baton Rouge, Louisiana, which joined the group this year as centers of information for teachers and administrators.

New supplemental materials—guides to the study of animal behavior, the art and science of exhibit design, and animals in the classroom—were provided to all *W.I.Z.E.* subscribers. A guide to the use of national forests as alternative sites for student fieldwork is currently being developed. These materials and periodic newsletters help maintain the currency and usefulness of *W.I.Z.E.* classwork and zoo field trips.

At the early end of the school spectrum, the *Pablo Python Looks at Animals* program ended two

years of testing among 750 kindergarten through third-grade students in 28 metropolitan area classes. The project's evaluator found that *Pablo* both expanded the time spent on teaching fundamental science skills and stimulated higher scores on content tests and science achievement mastery scales. This evidence helped secure national validation from the U.S. Department of Education after rigorous review by a national panel of experts. Federal funding has been received for dissemination, which will begin on October 1, 1991. The Bronx Zoo is now the only zoo in the country with two programs recognized for excellence in this way and disseminated with Federal funds.

Pablo Python brings science into the curriculum at an early stage, stressing observation skills and zoo visits for study and direct experience of the animals. Teacher-training workshops emphasize methods of teaching and using the zoo as a teaching resource. The program also promotes close interaction between parents and children on science-related activities. Two special workshops on *Pablo Python* were held in February at a conference titled "Exploring Math and Science" sponsored by the Bank Street College of Education.

Meanwhile, the department embarked on a long-term project, funded by a major grant from the National Science Foundation, to provide a national model of instruction on habitat ecology for grades 4-6,

filling the gap between *Pablo Python* and *W.I.Z.E.* When the program for this underserved audience is completed in 1994, nationally published curriculum materials will have been created by the department for every grade level from kindergarten through high school.

The *Habitat Ecology Learning Program* (*H.E.L.P.*) will train 33 teachers each year in 60-hour workshops at the Bronx Zoo, using innovative methods refined by the department over the past ten years. A multifaceted approach to subject matter will focus on learning beyond the classroom, at zoos and other sites, as well as classroom preparation and follow-up. Requiring participants to pass on the techniques they have learned in their home schools and districts will multiply the program's effectiveness.

Out of these sessions will evolve a comprehensive series of teachers' manuals that will help teachers in grades 4-6 to make ecology a coherent part of their science curriculum, with the zoo serving as a living classroom. Planning for national dissemination will be part of the four-year project.

H.E.L.P. will derive much of its subject



Bennett's wallaby at the Children's Zoo.



High school students in the Bronx Zoo's Animal Care Management program.

matter and methodology from the daily teaching experience of Zoo Education staff over the past decade, particularly in the award-winning *Windows on Wildlife* (*W.O.W.*) program. During the past fall and spring, 304 *W.O.W.* sessions on the ecology of various habitats were taught at the Zoo. A special *W.O.W.* series was attended by 70 students from P.S. 84 in Manhattan, thanks to a grant from Christadora, Inc. After attending six sessions at the Zoo on the earth's major biomes, with an emphasis on endangered species, the participants continued their study of how nature works with a trip to the Manice Education Center in Massachusetts.

A similar program, in ten sessions, was conducted for 25 homeless children from the Powers Avenue and Jackson Avenue Family Residences in the Bronx, sponsored by New York's Department of Cultural Affairs, the Human Resources Administration, and the Board of Education. The 30-hour program culminated with a gala party for the children and their families.

Planning for the new *Wildlife Biology Program* began during the year. Funded by a grant from Citibank, this in-depth, full-term course in subjects ranging from vertebrate zoology to conservation biology will provide an exciting alternative for students from all 16 Bronx high schools to attain credits in science. Conferences with guidance counselors and principals were held in the spring to introduce the program and arrange student schedules for extended periods of study at the Zoo.

In another new course, *Zoo Exhibition and Design*, 60 sixth-graders from the White Plains Inter-

mediate School explored in six sessions how animal biology, behavior, and husbandry influence zoo exhibit design from initial concept to final construction. Student designs were critiqued by instructors in the last session, and how they defended their projects provided a good reflection of how much they had learned.

A program of minority teaching fellowships began in the spring, thanks to a generous grant from The Rockefeller Group, with the hiring of three instructor trainees from Colgate University, Brooklyn College, and the City College of New York. Thirty-five hours of training prepared them to assist in teaching summer programs, including Zoo Camp and Around the World with Pablo Python.

Among the programs designed for the casual zoo visitor, two new self-guided tours—for JungleWorld and the Children's Zoo—were added to the six published in 1989. Visitors reported that the tours increased their interest in conservation. Additional self-guided tours are planned for visitors interested in aquatic animals around the Zoo and reptiles and amphibians at the newly renovated Reptile House. Nearly 35,000 visitors benefited from the self-guided tour program during the year.

Several new courses were inspired by the Baboon Reserve and African Village, opened in August, with its Africa Lab on-site classroom. "Lucy's Footsteps" explored the parallel development of humans and baboons in Africa, and "Tracking Wild Animals" trained participants in the use of biotelemetry. Equipment for the latter was funded by the Rudin Foundation, as is a multi-level kit of educational materials being developed for use in the Baboon Reserve.

NYZS staff teaching special sessions included Dr. Bonnie Raphael of Animal Health on reproductive studies, Dr. Mary Pearl of WCI on conservation efforts for monkeys and apes in Asia, Dr. Patricia Moehlman of WCI on her fieldwork with jackals in

Tanzania, and John Gwynne of Exhibition and Graphic Arts on the creation of Baboon Reserve.

"Cave Capers," "Bears," "Winter Wildlife Adventures," and "Let's Go to the Hop" were among the many programs that drew 2,913 general audience participants and 37,687 in organized school groups. Schoolchildren visiting the Zoo in organized groups totaled 309,948 for the year.

Friends of the Zoo, now numbering about 250 volunteers, led free guided tours for 17,095 schoolchildren and 1,799 adults, and visited 2,500 patients in hospitals and homes through the Outreach Program. They were also active in several key Zoo projects.

FOZ docents assisted logistics and even funding for the Rhino Walk led by Michael Werikhe. Several joined in the 10.8-mile trek from the Central Park



than equal time for the all-important subject of species survival.

Zoo educators of the 21st century will not want to settle for wildlife education as a nice frosting on the curricular cake. They should accept nothing less in the curriculum

Annette Bekovits
Chair of Education

Zoo to the Bronx Zoo. For Katherine the koala's stay at Zoo Center, two FOZ were stationed at the exhibit to provide visitors with information about koalas and their marsupial relatives. In an important research project, 25 FOZ members helped gather information on the nesting behavior of concave-casqued hornbills in the World of Birds that will be collated with data from ten other zoos to assess the mating success of these birds.



Teacher training at the Bronx Zoo involves animal care and handling.

Two new Biofact Carts, at which FOZ volunteers provide pertinent wildlife information to zoo visitors, were inaugurated, on elephants at Zoo Center and gelada baboons at the Baboon Reserve. Docents also worked tirelessly in the campaign to restore proposed City budget cuts.

The Children's Zoo opened in spring 1991 with new exhibits for Bennett's wallabies and ring-tailed lemurs, both in the Locomotion area. Participatory exhibits—pogo sticks for the wallabies and a climbing tree for the lemurs—help visitors understand the particular movements of these animals through imitation.

There were 532,007 visitors to the Children's



Jumping like a wallaby at the Children's Zoo.

Zoo, and 66,360 visitors enjoyed camel rides in Wild Asia Plaza, where four new dromedary camels joined the Zoo's herd.

New York Aquarium Education

Through its teacher training development programs in Discovery Cove, the department is reaching more and more teachers throughout the City, at every grade

level. Forty workshops during the year trained 16,500 teachers in using the Aquarium as a living classroom and inspired the creation of new programs, a sixteen-fold increase over the past two years. At P.S. 230 in Brooklyn, as an example of the program's success, the department worked with a sixth-grade teacher to establish an interdisciplinary marine science curriculum for gifted children incorporating trips to the Aquarium. Two other teachers at the school followed suit, and parents of the children have also become deeply involved.

A unique two-year program funded by the New York State Council on the Arts involves 25 students from Brooklyn's Thomas Jefferson High School in marine themes related to math, language arts, and social studies as well as biology and ecology. Named OCTOPUS by the students—for "Our Cultural Technologies and Our Place Under the Sea"—the program is developed around such topics as whales, sharks, fish, invertebrates, conservation, and career awareness and includes collecting and field trips in the New York area. In the program's second year, these high school students will teach and serve as mentors for middle school students.

OCTOPUS was part of an extensive educational program that enrolled about 42,000 schoolchildren during the year. In total, more than 275,000 schoolchildren visited Aquarium exhibits.

Reaching beyond the Aquarium's boundaries, the department created a program—"Senior Studies"—for environmentally conscious residents of local nursing homes. Using music, art, and artifacts, instructors conducted classes for 400 elder citizens, many of whom subsequently visited the Aquarium itself.

Awards associated with department efforts included the AAZPA Significant Achievement Award for the innovative concepts, exhibits, and graphic design of Discovery Cove; Long Island University's Presidential Award to Senior Instructor Merryl Kafka "In recognition of Outstanding Contributions to Science Education," sponsored by the New York Marine Educators Association; and the Partners in Education Award from the Training Opportunities Program to Coordinator of Special Projects LeAnn Gast, sponsored by the New York City Board of Education.

With a grant from the Hudson River Foundation, curricular materials for school groups and visitors



Young visitors at the Hudson River exhibit.

are being developed for the Aquarium's new Hudson River exhibit. They will focus on the river's history and conservation. Future programs will involve both upriver and downriver schools.

Central Park Zoo Education

General audience and school programs continued to grow. More than 1,000 adults and children learned about animals and their habitats in courses such as "The Birds" and "Animals for All Ages." New courses on the zoo's gardens, taught by Horticulturist Nancy Tim, showed visitors how the Tropic Zone's indoor rain forest was created and explored the challenges of using plants to establish naturalistic habitats.

In school programs, more than 200 teachers learned how to use the zoo as an educational resource in a series of workshops, and nearly 70,000 students visited the zoo for classes or in organized school groups.

A series of zoo-produced videos were installed in the Wildlife Conservation Center to give zoogoers a behind-the-scenes glimpse of the zoo and alert them to exhibits of special interest. The videos tour the zoo's

kitchens and explore the mating behaviors of penguins, puffins, caimans, and snakes.

Penguin-mating was also the subject of talks given by ZooGuides in the Edge of the Icepack exhibit. After in-depth training, the guides began a regular schedule of lectures throughout the penguins' nesting and breeding season.

Volunteer ZooGuides, now numbering 90, spearheaded an effort to keep the Central Park Zoo open during New York City's spring budget crisis. Stationed at the department's mobile cart, they collected nearly 100,000 signatures on petitions urging Mayor Dinkins and members of the City Council to restore zoo funding.

Publications

The new, more contemporary design of *Wildlife Conservation* magazine continued to garner praise in the publishing world. In September, *Wildlife Conservation* received an Ozzie Award for Design Excellence, sponsored by *Magazine & Design Production*. More than 1,300 entries were evaluated by a nationwide panel of judges, who gave *Wildlife Conservation* a Bronze Award for Best Redesign, Association, Nonprofit or Government; and Honorable Mention for Best Redesign in the Consumer category.

The Bronx Zoo's Paper, the two-year-old publication which supplies each visitor with a map of the Zoo and information on exhibits and guest services, received an Award of Merit from the Ohio Museums Association.

In its editorial content, *Wildlife Conservation* continued to emphasize endangered species and current issues in conservation. Noted wildlife journalists and photographers—such as Jon Luoma, John Mitchell, George Laycock, Edward Ricciuti, and Erwin and Peggy Bauer—covered a wide variety of topics ranging from the effects of air pollution on wild animals to the appalling conditions of many of our national wildlife refuges and the efforts to reintroduce wolves in Yellowstone National Park. The November/December issue included a special section on oil spills and their menace to wildlife around the world.

Wildlife Conservation also featured the discovery that chimpanzees dose themselves with plants that may hold promise for treating human ailments, the developing interest among large U.S. corporations



Visitors line up at the Central Park Zoo to protest city budget cuts.

in devoting some of their energy and resources to benefit wildlife, the annual spectacle of half a million sandhill cranes gathering on Nebraska's Platte River, and the unique tree-dwelling possums and kangaroos of Australia's rain forests.

Wildlife Conservation International's Director for Science George Schaller wrote from Mongolia about cooperative programs to preserve the Gobi brown bear, the snow leopard, and other rare creatures in that little-known country. Other WCI stories by WCI researchers included reports from Malaysia on that nation's mammoth undertaking to relocate problem wild Asian elephants to ensure their survival, on the dazzling courtship and breeding displays of New Guinea bowerbirds, and on the amazing array of primates in the Brazilian Amazon basin. In addition, *Wildlife Conservation* announced that Tanzania and WCI collaborated to set aside a corridor of land giving African elephants a much-needed safe passage between Manyara National Park and Marang Forest Reserve.

John Colson was hired as publisher of *Wildlife Conservation* in March to strengthen advertising sales and related business aspects of the magazine. A three-year strategic plan was developed, and its implementation began in late June.

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W.I.Z.E. in the World

Training for the second module of *Wildlife Inquiry through Zoo Education (W.I.Z.E.)—Survival Strategies*—has been provided since 1988 to 443 teachers serving more than 26,000 secondary school students in 29 states, Guam, Tanzania, Ivory Coast, Venezuela, Peru, and Belize. Dissemination of and teacher training for the award-winning curriculum, developed by the Bronx Zoo Education Department, is funded by the U.S. Department of Education's National Diffusion Network.

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Serving New York's Schools

More than 655,000 schoolchildren visited the zoos and aquarium in organized groups during the year.

Classes at all three facilities enrolled more than 80,000 students.

Every school district in New York City and most in the metropolitan area are served by classes and other programs at the Bronx Zoo, New York Aquarium, and Central Park Zoo.

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FOZ volunteers take notes at the World of Birds for hornbill breeding research.

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Where Imaginations Run Wild.
The New York Aquarium

Take the 181 St. Ave.
Side Take
at 180th St. then
turn Right

Where
Imaginations
Run Wild.

 The Bronx Zoo

SUSTAINING THE EFFORT

How the Society supports itself, serves the community, and informs the public. Reports on fund-raising, membership, marketing and communications, construction, maintenance, guest services, personnel, admissions, transportation, and group sales.

Public Affairs

As public funding continued to deteriorate during the year, the importance and urgency of raising private funds, membership, and public awareness grew. The effort and the response were heartening in many respects, and instructive in others, as new approaches emerged to sustain the Society's role in conservation, education, research, and cultural leadership.

The Society has forged ahead with major capital projects that are essential to the realization of its mission to save wildlife, teach ecology, and inspire care. Donors had already given generously to the Bronx Zoo's Baboon Reserve and African Market (opened in August 1990), to the Elephant Protection Plan and other aspects of conservation action in the field, to teacher training, wildlife nutrition, and wildlife pathology. At year's end accumulated capital support totaled \$18,247,861, including campaign-designated gifts of \$1 million from the George F. Baker Trust, \$500,000 from Dr. Judith Sulzberger, and \$433,000 from the Howard Phipps Foundation.

Funding for the Ecology Education Center at the Bronx Zoo got underway with \$510,000 from the Bodman Foundation, \$285,000 from the Henry and Lucy Moses Fund (plus critical operating support), \$250,000 from the Vincent Astor Foundation, \$135,000 from the Achelis Foundation, and \$75,000 from The Barker Welfare Foundation. Another zoo education project—Minority Education Scholar-

ships—received \$100,000 from Citibank and \$50,000 from The Rockefeller Group. Trustee Shirley Katzenbach provided \$250,000 to the Emil Dolensek Research Suite at the Animal Health Center, along with \$250,000 in annual support for the Society, and the Marilyn Simpson Charitable Trust gave \$75,000 toward the endowment for the Distinguished Scientist in Wildlife Nutrition. The Robert Wood Johnson, Jr. Charitable Trust's gift of \$450,000 went to the campaign's Crisis Fund for Vanishing Wildlife, \$200,000 of which was designated for the Saving Tropical Forests component. Additional campaign support was received from Mrs. Roswell Gilpatric and Manufacturers Hanover Trust.

Operating funds for the Bronx Zoo and New York Aquarium totaled \$2,776,614, with individuals giving \$691,284. George F. Baker joined the honor roll of Best Friends, those who have been responsible for gifts of \$1 million to the Society over their lives. Bequests totaling \$842,000 included \$254,662 from the estate of John F. Porter, \$152,848 from Jean Knowles, \$100,000 from Isabel and Henry Ault, and \$100,000 from Nell Webster. A gift of \$100,000 from long-time Annual Patron Peggy Catalane brought the Pooled Income Fund to more than \$450,000.

Among the 28 new contributors to the Sponsor-a-Species Program, which raised \$61,456 during the year, were the Allen Stevenson School, Cook College Student Activity, Hyde Park Elementary School, Lake



NYZS President Howard Phipps, Jr. presents the Society's Gold Medal to Gilbert Grosvenor and the National Geographic Society.

Mahopac Rotary Club, the Masters School, the New Jersey Branch of AALAS, Reliance Group Holdings, Inc., and Uni-Mail Corporation.

Foundations gave \$1,047,530 for budgetary purposes. Those providing \$20,000 or more in general support were the G. Unger Vetlesen Foundation, the Nichols Foundation, and the Park Avenue Charitable Fund. Designated grants included \$359,000 from the Edward John Noble Foundation for the Wildlife Survival Center on St. Catherines Island, \$100,000 from The Charles E. Culpeper Foundation for the Genetics Research Program, \$30,000 from the Norcross Wild-

life Foundation for educational graphics and interactive devices in the Bronx Zoo's new Northern Ponds exhibit, \$25,000 for Animal Health and Zoo Education from the Charles A. Dana Foundation, \$25,000 from the Louis Calder Foundation for the Childrens' Zoo Theater and *Windows on Wildlife*, and \$25,000 from the Samuel & May Rudin Foundation to create educational materials for the Charles W. Nichols, Jr. Africa Lab. A challenge grant from the Geraldine R. Dodge Foundation partially funds the development of educational materials for the *Pablo Python* curriculum.

The Business Committee, chaired by Richard Voell of The Rockefeller Group, helped raise \$1,008,300 from corporations. Gifts of \$20,000 or more were received from Bristol-Myers Squibb Foundation, Inc.; The Chase Manhattan Bank, N.A.; CITIBANK; Liz Claiborne Foundation; Coca-Cola USA; Consolidated Edison Company of New York; The Hoffmann-La Roche Foundation; Kal Kan Foods Inc.; The New York Times Company Foundation; The Ogilvy Foundation; Patagonia, Inc.; Pepsi Cola; The Reader's Digest Association; The Rockefeller Group; and Wyssmont Company, Inc. Significant gifts-in-kind were provided by Arnell Construction Corp., The Perkin-Elmer Corporation, General Motors Corporation, Olympus Corporation, Pan American World Airways, Inc., Philip Morris Companies Inc., and Timex Corporation.

More than \$129,000 was raised for education and WCI field programs at the Corporate Benefit

NYZS Membership Push

On-site recruitment at the Bronx Zoo, New York Aquarium, and Central Park Zoo brought in 6,731 new NYZS members by the end of the fiscal year, raising membership to an all-time high of 37,345. Strategically placed membership carts staffed by persuasive personnel selling the best institutional membership package in the City were part of an effort that aimed to sign up 10,000 new members by the end of the summer season.





A 10.8-mile walk from the Central Park Zoo for rhino conservation, led by Michael Wenkhe of Kenya, ended at the Bronx Zoo.

Dinner-Dance on June 26, chaired by Eugene R. McGrath of the Consolidated Edison Company of New York (the Business Committee's new chairman) and Robert G. Schwartz of the Metropolitan Life Insurance Company. On Corporate Sponsor Weekends, more than 10,000 employees of NYZS corporate donors were admitted free to the Bronx Zoo, New York Aquarium, and Central Park Zoo.

Funding for Wildlife Conservation International totaled \$3,152,120 and included contributions from individuals, foundations, and corporations, from William Beebe Fellows, Friends of WCI (co-chaired this year by John Pierrepont and Mr. and Mrs. Joseph R. Siphron), direct-mail appeals, and telemarketing. Programs in Africa, Asia, and the Americas were funded by a number of major donors.

The Liz Claiborne and Art Ortenberg Foundation gave \$317,000 for rain-forest and elephant protection programs. WCI's work in Malaysian Borneo was granted \$315,000 by the John D. and Catherine T. MacArthur Foundation. The Kleberg Foundation of Texas gave \$150,000 to conservation projects in Tanzania, and the Kinnoull Foundation of London

provided \$90,000 to help realize a conservation strategy for the Belize Barrier Reef, including funds to purchase Middle Caye.

The Armand Erpf Fellowship Award, established by Trustee Sue Erpf Van de Bovenkamp to provide \$10,000 annually over sixteen years for outstanding WCI scientists, was initially bestowed on Claudio Campagna for his marine mammal work in Argentina and Ullas Karanth for his study of tigers in India. Other important WCI gifts included \$45,000 from the Tortuga Foundation for conservation in Central and South America, \$25,000 from the Sacharuna Foundation for George Schaller's survey of Tibetan wildlife, and \$20,000 each from Advisor Bradley Goldberg and from Betty Wold Johnson and Douglas Bushnell.

Membership in WCI reached a new high of 56,000, with 13,000 added during the year. Special appeals included campaigns for the African elephant, Brazilian rain forests, WCI's Paseo Pantera ("Path of the Panther") program in Central America, and a new telemarketing effort on the same theme in late spring.

NYZS membership reached an all-time high



Jane Polin of the General Electric Foundation (right) presents check to Annette Berkovits and James Meeuwse for updating Windows on Wildlife (W.O.W.) materials.

of 37,345, an increase of nine percent over last year. Membership direct-mail appeals were complemented by concerted on-site campaigns at the zoos and Aquarium, where more than 6,700 new members were signed up.

Membership support for the Society grew by \$159,000 to more than \$2.1 million, an eight percent increase that can be ascribed to more members and higher rates instituted on April 1. At the same time, the Sustaining membership category was eliminated and the Senior category added. In response to our constituency, the Dual level was redefined to cover either two adults or one adult and one child. In addition to dues, members and other donors contributed more than \$185,000 through several direct-mail efforts and more than \$700,000 in annual operating support.

Annual members' clean-up drew more than 400 volunteers to the Bronx and Central Park zoos. At

the former, some participants helped to build the beaver dam at the new Northern Ponds exhibit. The 97th annual meeting at Avery Fisher Hall featured film footage of wildlife in the Bale Mountain region of Ethiopia and a compelling report on the illegal trade in reptile products by Central Park Zoo Curator Peter Brazaitis. The Society's gold medal was presented to NYZS Trustee Gilbert Grosvenor, Chairman of the National Geographic Society, in honor of cooperative ventures between NYZS and NGS in conservation.

Included in the expanding NYZS travel program were trips to Alaska, Kenya, Baja California, and Patagonia; whale-watching off Cape Cod; bird-watching at Jamaica Bay and Alley Pond Nature Center; and a voyage around New York Harbor on the sloop *Clearwater*.

Several changes and new developments should help to increase the effectiveness of the Marketing and Communications division. The need to market facilities, services, and products, to clarify the Society's mission as a global institution, and to proclaim achievements to an ever broader constituency has never been greater.

At the leadership level, a Marketing and Communications Committee was formed with Trustee John Elliott, Jr. as chairman. Committee members from the media and marketing disciplines will help promote the Society's goals and exploit the conservation-conscious marketplace. Internally, Marketing and Communications now encompasses Publications, which is responsible for *Wildlife Conservation* magazine, and Media Services, which includes audio and video production as well as photographic services and the Society's extensive and historic film and photo archives.

Traditional ventures in marketing included long-term commitments by Pepsi-Cola and Kodak that resulted from interdepartmental coordination. An array of promotional tie-ins were forged with such industry leaders as Kal Kan and Anheuser-Busch. Special arrangements were made with the Australian Tourism Commission and Warner-Lambert's Hall's Mentholyptus in support of Katherine the koala's visit to the Bronx Zoo. Licensing and corporate sponsorship brought in \$187,000 during the year, and receipts from 12 corporate events at the Bronx Zoo and Central Park Zoo came to \$79,450.

A new advertising campaign, on television and radio, in subways, suburban trains, and movie theaters, was launched emphasizing the visitor's experience inside the animals' world at the Bronx Zoo and New York Aquarium. "Where imaginations run wild" became a call to think about and understand a visit to the Zoo or Aquarium as an active, creative encounter.

Extensive and important media coverage at the zoos and aquarium revolved around major exhibits and events, as well as conservation and educational interests. ABC's "Good Morning, America" provided coverage of exceptional depth on the Society, with segments during one broadcast on the Bronx Zoo, the New York Aquarium, Wildlife Conservation International, and the Wildlife Survival Center.

Virtually all New York tri-state area media and a number of leading national publications, from *Time* to *Travel & Leisure*, ran feature articles on various aspects of the Society's program. Among this year's outstanding stories was *New Yorker* writer Tony Hiss's eloquent article for *The New York Times* on the Central Park Zoo. All NYZS facilities served as locations for various fashion and feature film shoots.

Response to the New York City budget crisis and ensuing reductions for cultural institutions was coherent and forceful. The general director's op-ed piece in *The New York Times*, along with general media coverage and highly vocal grassroots support may have helped to save some part of the cuts that were scheduled by the City.

Administrative Services

The Zoological Society entertained 3,519,920 visitors at its three New York facilities in fiscal 1991: 716,786 at the New York Aquarium, 806,089 at the Central Park Zoo, and 1,997,055 at the Bronx Zoo, where the parking areas accommodated 311,669 vehicles.

Transportation systems within the Bronx Zoo—the Bengali Express, Zoo Shuttle, and Skyfari—carried 1,341,929 guests. Against declines in other areas, JungleWorld had an increase in visitorship, which totaled 574,314.

Group Sales at the Bronx Zoo continued to expand its marketing program through travel and community organizations. Manager Margaret Price was elected to the board of directors of the New York Convention and Visitors Bureau.

A Food Service review of the most popular beverages, meals, and snacks resulted in menu simplification. Funnel cakes, Italian ices, and frozade, an all-natural frozen dessert, achieved immediate popularity. More mobile carts were introduced for greater convenience around the Zoo, two of the permanent



Waste Opportunities

A total recycling plan was instituted at the Bronx Zoo during the year for paper, glass, and metals, in cooperation with the New York City Department of Sanitation. The Zoo's plan and Recycling Center were cited by Sanitation as models for other City departments and agencies. By the end of the year, 29,763 pounds of paper, 89,100 pounds of cardboard, and 60 cubic yards of glass and metal had been shipped out for recycling.



The Aquarium's new shop features a view of the Oceanic Tank.

stands—in Wild Asia Plaza and Cotton Candy Hill—were reconstructed, and several stands were given new signage.

In merchandising, the big news came from the Aquarium, where the Sea Cliffs Gift Shop opened as the first phase of the major exhibition complex to be completed in 1992. This unusual facility, with its view into the beluga whale tank (temporarily occupied by seals), is able to offer more varied merchandise in a more attractive display setup than before.

All 425 of the seasonal and hourly employees in merchandise sales and food service, as well as admissions and transportation, learned about practical skills and the Society's mission in the Personnel Department's Seasonal Training Employment Program (STEP), which completed its fourth year. A new recruitment and training video helped in the process. Currently, 30 to 35 percent of seasonal employees return for subsequent seasons. This is up from 12 to 15 percent before STEP began in 1987. The DeWitt Wallace Fund and the Bernhill

Fund have provided program support.

Personnel reports a full-time staff of 633 employees (listed by department on pages 73–76) at the Bronx Zoo, New York Aquarium, Osborn Laboratories of Marine Sciences, Wildlife Survival Center, Wildlife Conservation International, Central Park Zoo, and Queens Zoo. Employment has increased 78

percent since 1980, increasing the challenge to secure qualified personnel and ensure diversity in its workforce. The Society was recognized for its employment efforts in 1990 by the New York City Housing Authority.

There isn't another organization that's like the New York Zoological Society. And I can't think of an organization that can do more in conservation and education than this one does.

Richard Voell
President and CEO
The Rockefeller Group, Inc.

Operations

After completing the Baboon Reserve and African Village in August, the Construction division, along with Exhibition and Graphic Arts, focused on the City-funded Northern Ponds, a renovation of the former Holarctic Tarn. Enlarged by dredging, divided by a simulated beaver dam, and bordered by new viewer overlooks, the Ponds opened to the public in June.

Another City project, rehabilitation of the Old Large Bird House on Astor Court, began in the winter. The building, to house offices for Public Affairs and Administrative staff, was scheduled for completion in 18 months.

Society-funded renovation of the Reptile House included new carpeting, lighting, and graphics, improved exhibits, and an enlarged, newly landscaped Turtle Pond outside the building. The public re-opening took place in June.

The Zoo's Cogeneration and District Heating System, funded by the Society and a Federal grant, began providing electrical and thermal energy in the spring. Surplus electrical power is being sold back to Con Edison as part of this modern, more efficient, and cost-effective system.

Exhibits for wallabies and lemurs opened at the Children's Zoo in the spring, and work on the Emil Dolensek Research Suite at the Animal Health Center proceeded toward completion in the summer. Both are NYZS capital projects.

In partnership with the City's Department of Sanitation, the Society built a recycling center in the Zoo's southwest corner. Facilities were created for baling empty cardboard boxes, segregating glass and metal, and separating office paper for recycling. The program was cited as a model for all institutional agencies.

City-purchased vehicles and equipment, including a backhoe, a rack truck, and a garbage truck, were put into service. Delivery of a street-flusher truck is expected in the winter.

Projects underway are the Zoo Monitoring System, which will combine all fire, security, and environmental alarms at a control center, and the modernization of the World of Birds kitchen. Several of Guest Service's food stands were expanded before their spring opening, and new equipment was installed to reduce the waiting time for service.

Expected to start in the coming year are the



The massive rockwork of Sea Cliffs at the Aquarium will simulate a variety of rugged coastal habitats.

City-funded Elk Range restoration and the Society-funded World of Bird Phase I renovation. The City is also funding a long-range study for relocating the Service Yard from the Zoo's center to a more appropriate, less congested location.

At the Aquarium, as work continued on Sea Cliffs, a large holding pool was built for animals that will ultimately live there. The Aquatheater was given a facelift with sandblasting and repainting, and renovation of the Animal Records room included a new floor.

REPORT OF THE TREASURER

Report of the Treasurer

The Society's financial results for the fiscal year ending June 30, 1991 reflected the challenges associated with the diversity of its programs. Expenditures for operating purposes exceeded revenue by 1.4 million. Management efforts to substantially reduce the deficit were made more difficult by a reduction in City support for the Bronx and Central Park zoos.

Contributed support in excess of \$6.8 million, a record amount, provided funds to expand conservation efforts throughout the world and maintain institutional programs in New York.

A \$1.4 million grant from the Lila Acheson Wallace Fund for the New York Zoological Society, an independent supporting organization, funded beautification projects at the Bronx and Central Park zoos. Revenue from a loyal and increasing membership roster reached a new plateau, \$2 million. Income from endowment sources provided \$2.8 million.

The City of New York provided support through the Department of Cultural Affairs for the Bronx Zoo (\$7.7 million) and New York Aquarium (\$1.9 million), and the Department of Parks and Recreation for the Central Park Zoo (\$2.5 million). The State of New York, principally through its Natural Heritage Trust program, provided \$1.8 million to the Bronx Zoo and \$178,000 to the Aquarium. Federal sources provided \$240,000 for education programs at the Bronx Zoo and \$700,000 for Wildlife Conservation International's programs.

Attendance at the Society's three institutions exceeded 3.5 million visitors generating \$6.7 million in gate admission fees and \$3.1 million in exhibit admissions.

	(000)		
	<u>Attendance</u>	<u>Admission \$</u>	<u>Exhibit \$</u>
Bronx Zoo	1,997	3,518	3,087
New York Aquarium	717	2,233	—
Central Park Zoo	806	949	—
	<u>3,520</u>	<u>6,700</u>	<u>3,087</u>

Net revenue from Guest Services (consisting of food, merchandise sales, and parking) operated by the Society at the Bronx Zoo and Aquarium amounted to \$3.4 million. Concession fees from independent vendors at the Central Park Zoo added \$382,000.

	(000)		
	<u>Sales \$</u>	<u>Expense \$</u>	<u>Net \$</u>
Bronx Zoo			
Food	4,209	2,805	1,404
Merchandise	1,456	1,074	382
Parking	1,038	210	828
	<u>6,703</u>	<u>4,089</u>	<u>2,614</u>
Aquarium			
Food	723	502	221
Merchandise	472	274	198
Parking	405	56	349
	<u>1,600</u>	<u>832</u>	<u>768</u>

REPORT OF THE TREASURER

	Sales \$	Expense \$	Net \$
Central Park Zoo			
Food	334	—	334
Merchandise	48	—	48
	<u>382</u>	<u>—</u>	<u>382</u>
	<u>8,685</u>	<u>4,921</u>	<u>3,764</u>

Subscription income from *Wildlife Conservation* magazine and other programs revenues provided \$1.8 million in revenue.

Program costs accounted for 85 percent of operating expenditures, fund raising, 7 percent, and management and general, 8 percent.

Salaries, wages, employee benefits and payroll taxes were \$26.3 million (59) percent, reflecting the labor intensive nature of caring for living collections. Supplies, materials, and purchased services amounted to \$7.2 million (16 percent). Grants disbursed to support Wildlife Conservation International field programs were \$3.5 million (8 percent). Animal food and forage costs were \$1.0 million (2 percent).

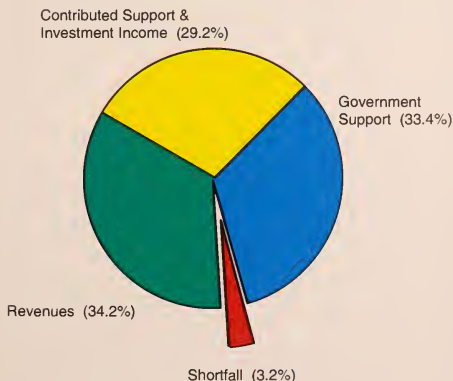
Utility costs were \$2.1 million (5 percent); property and casualty insurance \$1.2 million (3 percent); television, radio, and print advertising \$1.0 million (2 percent).

Society expenditures for capital improvement projects were \$12.2 million; an additional \$8.3 million was funded directly by the Department of Cultural Affairs of the City of New York.

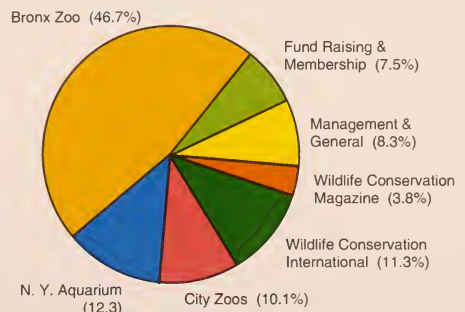
At the Bronx Zoo, the Baboon Reserve-African Market exhibit opened in July 1990, the Reptile House was renovated and reopened as the World of Reptiles in June 1991. Final testing was underway on the Zoo cogeneration facility expected to be operational in fiscal year 1992.

Frederick A. Melhado

Sources of Operating Support and Revenue



Operating Expenditures



Independent Auditors' Report

The Board of Trustees
New York Zoological Society:

We have audited the accompanying balance sheet of New York Zoological Society as of June 30, 1991, and the related statements of support and revenue, expenditures, capital additions and changes in fund balances, and cash flows for the year then ended. These financial statements are the responsibility of the Society's management. Our responsibility is to express an opinion on these financial statements based on our audit.

We conducted our audit in accordance with generally accepted auditing standards. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement. An audit includes examining, on a test basis, evidence supporting the amounts and disclosures in the financial statements. An audit also includes assessing the accounting principles used and significant estimates made by management, as well as evaluating the overall financial statement presentation. We believe that our audit provides a reasonable basis for our opinion.

As explained in note 1 to the financial statements, expenditures for land, buildings and equipment are not capitalized; therefore, depreciation of buildings and equipment is not recorded. The effect of this departure from generally accepted accounting principles on the financial statements is not readily determinable.

In our opinion, except for the effect on the financial statements of the matter discussed in the preceding paragraph, the financial statements referred to above present fairly, in all material respects, the financial position of New York Zoological Society as of June 30, 1991, and the results of its operations and its cash flows for the year then ended in conformity with generally accepted accounting principles.

KPMG Peat Marwick

September 6, 1991

REPORT OF THE TREASURER

NEW YORK ZOOLOGICAL SOCIETY

Balance Sheet

June 30, 1991

Assets	Operating funds	Endowment funds
Cash, including short-term investments of \$10,657,480	\$ 12,448,569	—
Investments (note 2)	26,133,292	40,823,174
Accounts receivable	1,487,475	—
Grants and pledges receivable	9,471,813	—
Inventories, at lower of cost or market	949,604	—
Prepaid expenses and deferred charges	1,141,725	—
	<u>\$ 51,632,478</u>	<u>40,823,174</u>
Liabilities and Fund Balances		
Accounts payable and accrued expenses	6,496,357	—
Loan payable (note 3)	842,159	—
Deferred restricted support and revenue (note 6)	17,253,871	—
Other liabilities	413,178	—
	<u>25,005,565</u>	<u>—</u>
Fund balances:		
Unrestricted:		
Designated for long-term investment	26,133,292	
Undesignated	493,621	
Endowment:		
Income unrestricted	—	19,478,877
Income restricted	—	11,680,420
Term endowment - income unrestricted (note 4)	—	9,663,877
	<u>26,626,913</u>	<u>40,823,174</u>
	<u>\$ 51,632,478</u>	<u>40,823,174</u>

See accompanying notes to financial statements.

REPORT OF THE TREASURER

NEW YORK ZOOLOGICAL SOCIETY Statement of Support and Revenue, Expenditures, Capital Additions and Changes in Fund Balances

Year ended June 30, 1991

	Operating funds			Endowment funds
	General	Capital	Total	
Operating support and revenue:				
Contributions, including grant from supporting organization and fund raising events, net (notes 6 and 11)	\$ 8,237,486	2,446,664	10,684,150	—
Government support (note 9)	14,998,313	6,368,661	21,366,974	—
Admission and exhibit fees	9,788,085	—	9,788,085	—
Membership dues	2,058,192	—	2,058,192	—
Endowment income	2,815,591	123,190	2,938,781	—
Publications	1,080,130	—	1,080,130	—
Other revenue	743,849	41,900	785,749	—
	<u>39,721,646</u>	<u>8,980,415</u>	<u>48,702,061</u>	
Guest services (note 10)	8,684,992	—	8,684,992	—
Total operating support and revenue	<u>48,406,638</u>	<u>8,980,415</u>	<u>57,387,053</u>	<u>—</u>
Expenditures:				
Program services:				
Zoological Park	20,516,981	4,068,840	24,585,821	—
Aquarium / Marine Sciences	5,523,411	7,772,492	13,295,903	—
Survival Center	456,134	43,324	499,458	—
Wildlife Conservation International	5,132,252	103,181	5,235,433	—
Publications	1,651,753	—	1,651,753	—
Membership activities	974,502	—	974,502	—
City Zoos project (note 8)	4,526,846	256,193	4,783,039	—
Total program services	<u>38,781,879</u>	<u>12,244,030</u>	<u>51,025,909</u>	<u>—</u>
Supporting services:				
Management and general	3,717,093	—	3,717,093	—
Fund raising	\$ 2,412,771	—	2,412,771	—
Total supporting services	<u>6,129,864</u>	<u>—</u>	<u>6,129,864</u>	<u>—</u>
Guest services (note 10)	4,921,227	—	4,921,227	—
Total expenditures	<u>49,832,970</u>	<u>12,244,030</u>	<u>62,077,000</u>	<u>—</u>
Excess of expenditures over operating support and revenue, carried forward	<u>(1,426,332)</u>	<u>(3,263,615)</u>	<u>(4,689,947)</u>	<u>—</u>

(Continued)

REPORT OF THE TREASURER

NEW YORK ZOOLOGICAL SOCIETY

Statement of Support and Revenue, Expenditures, Capital Additions and Changes in Fund Balances, Continued

	Operating funds			Endowment funds
	General	Capital	Total	
Excess of expenditures over operating support and revenue, brought forward	(1,426,332)	(3,263,615)	(4,689,947)	—
Bequests	841,974	—	841,974	—
Realized net gains on investments	1,253,182	132,241	1,385,423	—
Excess (deficiency) of support and revenue over expenditures before capital additions	668,824	(3,131,374)	(2,462,550)	—
Capital additions:				
Contributions	—	—	—	3,122,348
Realized net gains on investments	—	—	—	2,348,619
Total capital additions	—	—	—	5,470,967
Excess (deficiency) of support and revenue over expenditures after capital additions	668,824	(3,131,374)	(2,462,550)	5,470,967
Fund balances at beginning of year	26,272,929	—	26,272,929	38,168,741
Transfer to fund capital expenses	(314,840)	314,840	—	—
Term endowment expiration (note 4)	—	2,816,534	2,816,534	(2,816,534)
Fund balances at end of year	\$ 26,626,913	—	26,626,913	40,823,174

See accompanying notes to financial statements.

REPORT OF THE TREASURER

NEW YORK ZOOLOGICAL SOCIETY

Statement of Cash Flows

Year ended June 30, 1991

	Operating funds	Endowment funds
Cash flows from operating activities:		
Excess of support and revenue over expenditures after capital additions and term endowment expiration	\$ 353,984	2,654,433
Adjustments to reconcile excess of expenditures over support and revenue to net cash provided by operating activities:		
Realized net gains on investments	(1,365,211)	(2,348,619)
Increase in accounts receivable	(355,590)	—
Increase in grants and pledges receivable	(3,725,384)	—
Decrease in inventories	41,406	—
Decrease in prepaid expenses and deferred charges	4,721	—
Increase in accounts payable and accrued expenses	993,320	—
Increase in deferred restricted support and revenue	6,468,185	—
Increase in other liabilities	213,208	—
Total adjustments	2,274,655	(2,348,619)
Net cash provided by operating activities	2,628,639	305,814
Cash flows from investing activities:		
Sales of investments 14,767,269	27,044,141	—
Purchase of investments (9,274,403)	(27,349,955)	—
Net cash provided by (used in) investing activities	5,492,866	(305,814)
Cash flows from financing activities:		
Principal payments on loan payable	(109,075)	—
Net increase in cash	8,012,430	—
Cash at beginning of year	4,436,139	—
Cash at end of year	\$ 12,448,569	—
Supplemental disclosure - interest paid	\$ 90,139	—

See accompanying notes to financial statements.

REPORT OF THE TREASURER

NEW YORK ZOOLOGICAL SOCIETY

Notes to Financial Statements

June 30, 1991

(1) Summary of Significant Accounting Policies

The financial statements of the Society have been prepared on the accrual basis, except for depreciation as explained below. Other significant accounting policies follow:

Fund Accounting

In order to ensure observance of limitations and restrictions placed on the use of available resources, the accounts are maintained in accordance with the principles of fund accounting. This is the procedure by which resources for various purposes are classified for accounting and reporting purposes into funds established according to their nature and purposes. Separate accounts are maintained for each fund; however, in the accompanying financial statements, funds that have similar characteristics have been combined into fund groups.

The assets, liabilities and fund balances of the Society are reported in two self-balancing fund groups:

Operating funds, which include unrestricted and restricted resources:

- Unrestricted funds represent the funds available for the support of Society operations.
- Funds restricted by the donor, grantor, or other outside party for particular operating purposes (including accessions and other capital additions) are deemed to be earned and reported as revenues of operating funds when the Society has incurred expenditures in compliance with the specific restrictions. Such amounts received but not yet earned are reported as deferred restricted support and revenue.

Endowment funds, which include the following resources:

- Funds that are subject to restrictions of gift instruments requiring in perpetuity that the principal be invested and only the income be used.
- Term endowment funds which must be held intact except that, at some future date or specified occurrence, some portion or all of the principal may be used (see note 4).

Plant Assets and Depreciation

Plant acquisitions including buildings and improvements constructed on land owned by the City of New York are not capitalized and, accordingly, depreciation is not recorded in the Society's financial statements. Major expenditures for buildings and improvements are reflected as capital expenditures in the accompanying financial statements.

Collections

Expenditures for collections are not capitalized.

Other Matters

All gains and losses arising from the sale, collection or other disposition of investments and other noncash assets are accounted for in the fund that owned the assets. Ordinary income from investments, receivables, and the like, is accounted for in the fund owning the assets, except for income derived from investments of endowment funds, which is accounted for, if unrestricted, as revenue of the unrestricted operating fund or, if restricted, as deferred amounts until the terms of the restriction have been met.

Enforceable pledges for operating purposes, less an allowance for uncollectible amounts, are recorded as receivables in the year made. Pledges for support of current operations are recorded as operating fund support. Pledges for support of future operations are recorded as deferred amounts in the operating fund. Pledges to the endowment funds are recognized upon payment of the pledge.

(2) Investments

Investments are reflected at cost or fair market value at date of gift. The market value and carrying value of investments managed by the Society at June 30, 1991 were as follows:

	Market value	Carrying value
Operating funds	\$ 34,233,422	26,133,292
Endowment funds	53,381,796	40,823,174
Wallace Fund*	<u>23,325,040</u>	<u>23,325,040</u>
	<u>\$ 110,940,258</u>	<u>90,281,506</u>

* The accompanying balance sheet does not include these investments which are managed by the Society on behalf of the Wallace Fund (see note 11).

Details of investments managed by the Society at June 30, 1991 were as follows:

	Market value	Carrying value
Net interfund payables	\$ (1,441,243)	(1,441,243)
Short-term investments	20,008,398	19,971,045
Corporate stocks	81,214,400	60,855,874
U. S. Government obligations	<u>11,158,703</u>	<u>10,895,830</u>
	<u>\$ 110,940,258</u>	<u>90,281,506</u>

Investments are pooled on a market value basis with each individual fund subscribing to or disposing of units on the basis of the value per unit at market value, determined quarterly. Of the total units, each having a market value of

(Continued)

REPORT OF THE TREASURER

Notes to Financial Statements (Continued)

\$277.29, 192,511 units were owned by the endowment funds, 123,456 units were owned by operating funds and 84,117 were owned by the Lila Acheson Wallace Fund for the New York Zoological Society (Wallace Fund) at June 30, 1991. The average earnings per unit, exclusive of net gains, amounted to \$10.83 for the year ended June 30, 1991.

During the year ended June 30, 1991, investment pool purchases and sales amounted to \$36,624,358 and \$41,811,410, respectively.

The following tabulation summarizes changes in relationships between carrying values and market values of investments:

	Market value	Carrying value	Net gains (losses)
End of year	\$ 110,940,258	90,281,506	20,658,752
Beginning of year	<u>91,131,860</u>	<u>68,429,688</u>	<u>22,702,172</u>
Decrease in unrealized net gains for year			(2,043,420)
Realized net gains for year			3,713,831
Total net gains for year			<u>\$ 1,670,411</u>

(3) Loan Payable

Construction of a cogeneration facility at the Zoological Park began during 1987. The estimated cost of the project is \$10,000,000. The City of New York through its capital improvement budget is funding approximately \$5,000,000. The remaining \$5,000,000 is being funded by the Society, of which approximately \$4,900,000 had been expended through June 30, 1991. An Urban Development Action Grant provided \$1,000,000 in financing through a loan from the Financial Services Corporation. As of June 30, 1991, \$842,159 was outstanding under this agreement. The loan agreement requires monthly amortization of principal and interest payments at an annual rate of 10%. The principal balance outstanding under the terms of the loan agreement is due on December 30, 1994.

(4) Term Endowment (Animal Kingdom Fund)

During 1976, the Society initiated a capital funds campaign. The campaign included a term endowment fund to serve various functions, as described below, subject to the following conditions:

- The income of the term endowment fund shall be used for the general operating purposes of the Society; and
- The principal of the term endowment fund may be expended only upon the affirmative vote of two-thirds of the Trustees present at any duly held meeting of the Board of Trustees or its Executive Committee: (i) to finance programs or improvements to facilities (i.e., the Zoological Park, the New York Aquarium, or other facilities of the Society) to produce revenue or increase attendance; or (ii) to ensure the survival of the Society if funds from other sources fail to provide sufficient revenue to maintain the Society's programs; provided, however, that in the case of any contribution to the term endowment fund which was subject to a restriction not to expend the principal of such contribution without the prior consent of the donor thereof, in addition to the vote of the Trustees described above, such consent must be obtained in writing prior to the expenditure of such principal. For the year ended June 30, 1991, the Society transferred expired term endowments aggregating \$2,816,534 to operating funds to fund capital expenses.

(5) Pension Plan

All eligible Society employees are members of the Cultural Institutions Retirement System's (CIRS) Pension Plan, a defined benefit plan. Pension expense for the year ended June 30, 1991 was approximately \$991,000, of which approximately \$339,000 was financed by an appropriation from the City of New York. The current year's provision includes amortization of prior service costs over a period of 30 years which commenced June 30, 1974. The Society's policy is to fund pension cost accrued, and no unfunded vested benefits existed as of June 30, 1990, the date of the latest plan valuation.

Because the CIRS Plan is a multi-employer plan, certain information as it relates to vested and nonvested benefits as well as plan assets is not readily available.

(6) Deferred Restricted Support and Revenue

The changes in deferred restricted support and revenue for the year ended June 30, 1991 were as follows (see Figure A):

(Continued)

Figure A

	Balance at beginning of year	Additions	Expenditures	Balance at end of year
Contributions and fund raising events	\$ 7,513,706	8,346,672	6,233,824	9,626,554
Grant from supporting organization	1,545,108	3,635,000	2,633,165	2,546,943
Fees and grants from governmental agencies	386,553	9,620,169	7,266,764	2,739,958
Investment income	375,644	1,561,088	560,193	1,376,539
Net gains on investment transactions	872,535	112,029	132,241	852,323
Other	92,140	196,342	176,928	111,554
Total	\$ 10,785,686	23,471,300	17,003,115	<u>17,253,871</u>

Notes to Financial Statements (Continued)

(7) Collections

During the year ended June 30, 1991, animal collection accessions aggregated approximately \$118,000, while de-accessions aggregated approximately \$41,000.

(8) City Zoos Project

The Society and the City of New York have entered into an agreement with respect to the Central Park Zoo which provides for the City's renovation of the Central Park Zoo in accordance with plans developed through consultation with the Society and approved by the City and, thereafter, for the Society's operation and management of the Central Park Zoo with funding from the City, for an initial ten-year term, renewable by the Society for five additional ten-year terms. The Society committed approximately \$20,000,000 toward design and renovation costs at the Central Park Zoo. This commitment was fully expended at June 30, 1991.

The Society and the City of New York entered into similar agreements with respect to the Prospect Park Zoo and the Flushing Meadows Zoo, except that the Society will expend no monies for construction. The Society is not currently involved in the operations or management of either of these facilities.

(9) City of New York Support

The Department of Cultural Affairs of the City of New York, in addition to providing general operating support, has reported to the Society that during fiscal 1991 it expended approximately \$8,256,685 at the Zoological Park and the Aquarium for capital improvements. Such amounts are not included in the accompanying financial statements.

(10) Guest Services

Revenues and expenditures of guest services (consisting of food, merchandise sales and parking) for the year ended June 30, 1991 were as follows:

	<u>Revenues</u>	<u>Expenditures</u>
Bronx Zoo	\$ 6,703,095	4,089,346
New York Aquarium	1,599,575	831,881
Central Park Zoo*	382,322	—
	<u>\$ 8,684,992</u>	<u>4,921,227</u>

* Guest service operations at the Central Park Zoo have been contracted to independent vendors who make remittances to the Society based upon sales.

(11) Lila Acheson Wallace Fund for the New York Zoological Society (Wallace Fund)

The Wallace Fund was established for the benefit of the New York Zoological Society in 1982. It is governed by an independent Board of Directors, including representatives of The Reader's Digest Association, Inc. and of the Society. It is a separate New York not-for-profit corporation that has been classified by the Internal Revenue Service as a supporting organization under Section 509(a)(3) and recognized as tax exempt under Section 501(c)(3). As of June 30, 1991, the market value of the net assets of the Wallace Fund approximated \$153,610,000.

Income of the Wallace Fund is granted each year to support the beautification and maintenance of the Central Park and Bronx Zoos, and such other programs as may be agreed upon by the Society and Directors of the Wallace Fund. The Wallace Fund granted \$3,635,000 to the Society during fiscal 1991.

In March 1991, the Wallace Fund entered into an investment delegation agreement with the Society pursuant to which the Society's investment committee assumed management of certain Wallace Fund assets which participate in the Society's pooled investment fund (see note 2).

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"To the New York Zoological Society, a not-for-profit, tax-exempt membership organization incorporated in the State of New York in 1895, having as its principal address the New York Zoological Park, Bronx, New York 10460, I hereby give and bequeath _____ for the Society's general purposes."

In order to help the Society avoid future administration costs, it is suggested that the following paragraph be added to any restrictions that are imposed on a bequest:

"If at some future time in the judgment of the Trustees of the New York Zoological Society, it is no longer practical to use the income or principal of this bequest for the purposes intended, the Trustees have the right to use the income or principal for whatever purposes they deem necessary and most closely in accord with the intent described herein."

If you wish to discuss the language of your bequest with a member of the Society's staff, please be in touch with the President's office (212) 220-5115.

Howard Phipps, Jr., President



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